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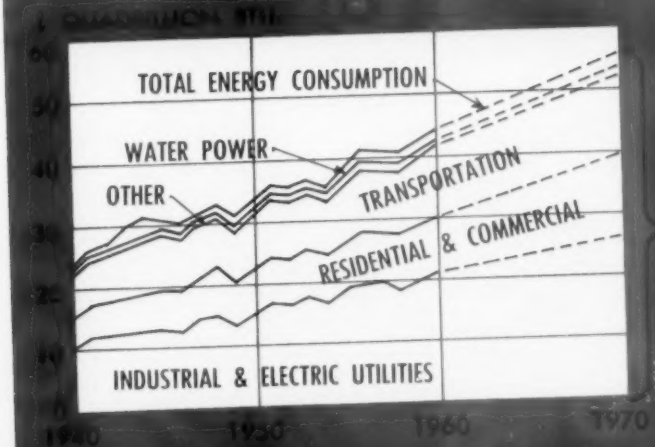
PETROLEUM WEEK

A McGRAW-HILL PUBLICATION



65% of the energy utilized in the U.S. could be interchanged

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Price 50 Cents

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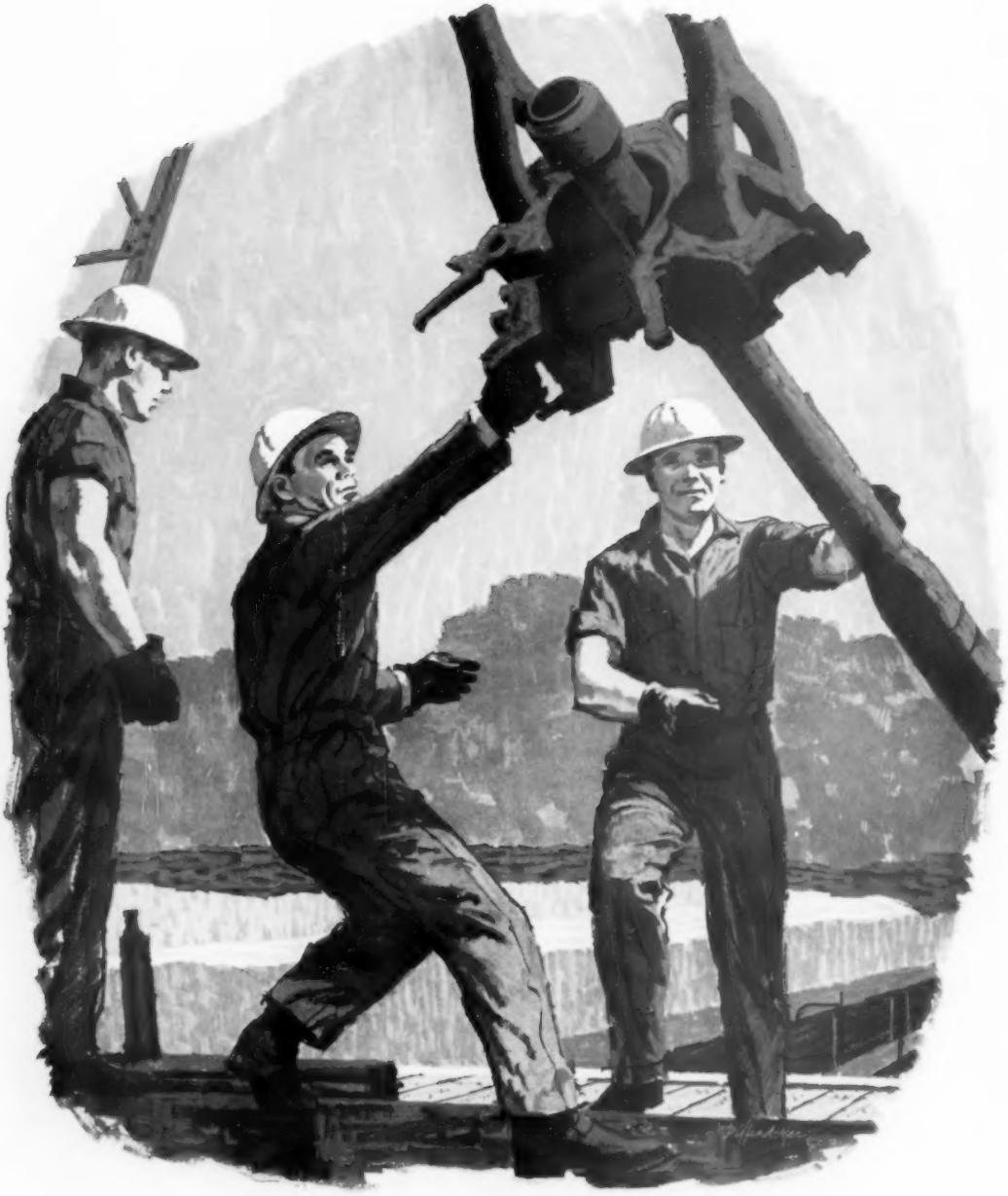

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reports. Over the years, the number of samples tested increased and speed of reporting was stepped up.

In 1955 each brand was coded so companies could see how their products ranked. Today, 1,000 samples from 57 marketing

centers are reported on monthly, and the results also summarized in an Annual Review. Another example of Ethyl's philosophy that **"GOOD"** is never good enough.

WHERE "GOOD" IS NOT GOOD ENOUGH

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Actually, there's a dozen more good reasons why this UNIBOLT Adjustable Wing Valve is a solid favorite among value-conscious operators:

1. There are no exposed threads, no accidental damage.
2. All metal seats . . . not affected by high or low temperature.
3. Stem packing that needs no tightening.
4. Stem turns freely under high pressures.
5. Threads on stem not exposed to external or internal damage.
6. Full 2½" pilot for true stem alignment and rigidity.
7. Streamlined flow—no obstruction, no turbulence or impingement of flow, no negative pressure areas.
8. Requires no grease to effect a seal . . . may also be used as micrometer-gauged flow bean.
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Views That Make News

Gas Story a Hit

Dear Sir:

Let me express my sincere appreciation for the splendid article on Hemphill County, Tex., and Ellis County, Okla., "Gas Play Bridges Texas-Oklahoma Line" [PW—Jan.27'61,p16].

This is one of the best articles that I have ever read in PETROLEUM WEEK. It was not only a splendid article, but it was accurate. This was an area that has long since been due such a splendid article. I congratulate PETROLEUM WEEK for making such a story possible to those of us who are readers.

Might I call your attention to the fact that in the West Short Junction field, Cleveland County, Okla., arrangements have been made to start a waterflood in the near future.

Too many of us have seen the West Shore Junction field suddenly stop producing when engineering data show that by waterflood it will produce and help the economy of Oklahoma materially. Believe me, anything that will help the economy of our state at this time will be deeply appreciated by everyone, because whether we want to believe it or not, there is a recession, and anything that will put men to work, and make fields that are capable of producing as they should, is most welcome.

WALTER L. GRAY
Oklahoma City, Okla.

How Soluble Is Methane?

Dear Sir:

Your letter in "Views That Make News" [PW—Jan.27'61,p2] by Dr. Farmer of Central Counties Oil & Gas Co. states that gas storage under flatrock will not work because methane is soluble to the extent of 600 cu. ft. of natural gas per cubic foot of water.

According to data of Kobayashi & Katz, 1 cu. ft. of water at 77F and 300 psi. will dissolve approximately one-half a standard cubic foot of methane. This reduces the loss calculated by Dr. Farmer by a factor of 1,000.

GLEN R. DAVIS
Sinclair Oil & Gas Co
Tulsa

Superstations Applauded

Dear Sir:

I have followed Indiana Standard's superstation experiment with a great deal of interest since the first article appeared about 1½ years ago. The idea behind this experiment is in line with my own thinking on the most effective method for alleviating the interrelated results of the most pressing problem in petroleum marketing, which I see as low average gallonage per station and inadequate profit potential for dealers.

The sequential results are: inability to attract desired caliber of dealers; low-caliber attendants who more often than not represent the face of the dealer and thus the oil company; ineffective training; lack of consistently good service; excessive dealer and attendant turnover; poor public relations and company/industry image, which negates a large part of the institutional advertising of the oil companies; and finally, an insufficient level of profits for the marketing departments of suppliers.

This experiment, carried further by Standard and other marketers, would most certainly improve some of the above undesirable characteristics, which are all too prominent in today's marketing. If indeed the superstation provides an equal or greater profit contribution and return on investment over the stations it has replaced, then this kind of thinking will go a long way toward improving the economic climate in marketing.

GEORGE W. DEETER
Market research division
Continental Oil Co.

How to Regulate Gas

"The great regulatory problem of 1961 is to devise a practical, sensible and administrable way to regulate production of natural gas, which will neither destroy nor socialize the natural gas industry. The court-imposed cost-of-service, utility-type approach has clearly proven unworkable and places a premium on inefficiency, waste, and hard luck. It drives low-cost gas into intrastate markets and high-cost gas into interstate markets."

W. J. MURRY, JR.
Chairman
Texas Railroad Commission

PETROLEUM WEEK *will publish reader comments each week. Address letters to LeRoy Menzing, Editor,* PETROLEUM WEEK, *330 W. 42nd St., New York 36, N. Y.*

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INSIDE Slant

AUTOMATION DEFINED

Automation is nothing more than the continuation of progress that began when man discovered the lever, invented the wheel, and otherwise began to provide himself with tools to ease and improve his labors.

It does not apply solely to electronic brains, but to the entire "toolbox" of better mechanical equipment.

This excellent summation of automation appears in the current issue of Review, house organ of Imperial Oil Ltd.

The article states:

"At Imperial, for example, the net investment per employee in plant and equipment has risen from $16,704 in 1947 to more than $62,000 today.

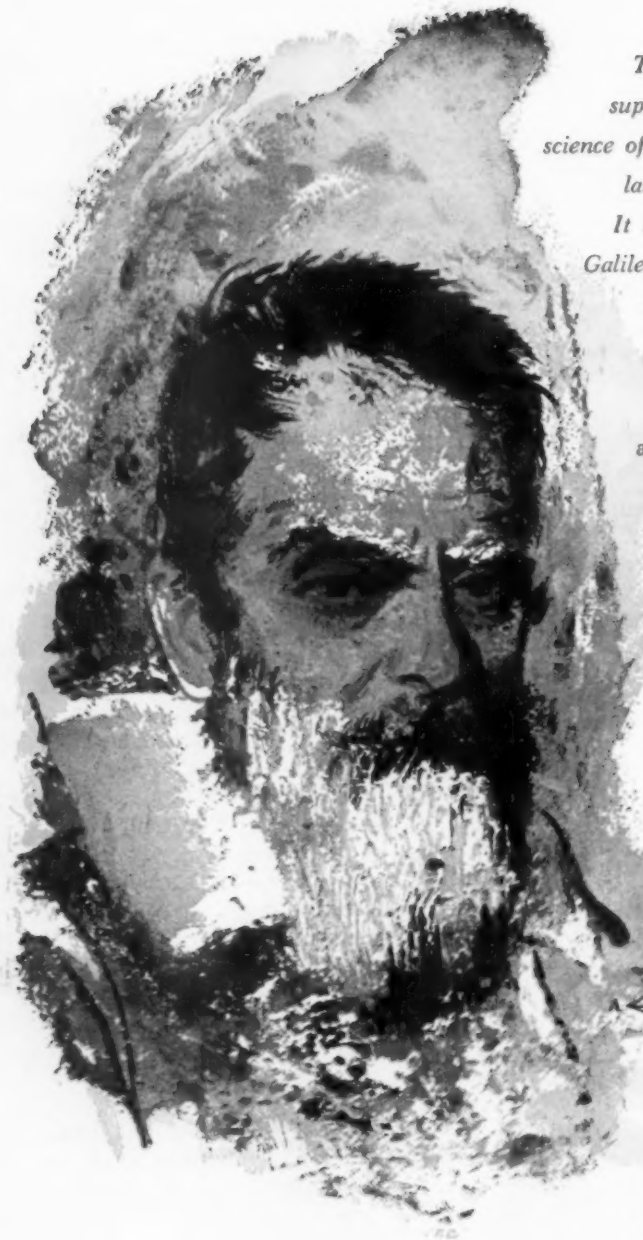
"In other words, each employee is responsible for, or has available to him, some $45,000 more equipment.

"The object, of course: higher quality and greater efficiency. And this, in essence, is modern automation—part of the ever-improving productive process that follows from the invention and improvement of machines . . .

"As long as machines continue to work for men, there is little to fear from automation."

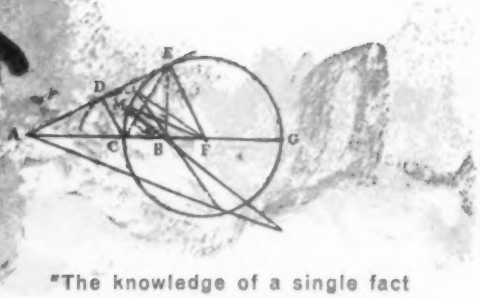
LeRoy Menzing
Editor

THE QUALITY OF THINKING



The mind of Galileo—keenly analytical, superbly trained—led him to founding the science of experimental physics, which, centuries later, is revealing the mysteries of space. It is self-evident by his achievements that Galileo's mind reached a level of quality far above ordinary standards of excellence.

Within the same area of meaning, the quality of minds responsible for an engineering project can be evaluated only by results. When you check the record of Brown & Root's engineering through the years, the high quality of thinking reveals itself. Customer satisfaction from greater efficiency at lower costs has built a worldwide reputation for engineering and construction by Brown & Root.



"The knowledge of a single fact through a discovery of its causes prepares the mind to understand and ascertain other facts..."
Galileo

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60-Second Summary / WHAT'S HAPPENING IN OIL

March 3, 1961

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President Kennedy proposed a pay-as-you-go highway financing plan this week that would hike user taxes and retain the 4¢ gasoline tax. The proposal is designed to complete the interstate system by 1972. . . . p. 10

•

More and more products of petrochemical origin are going into the manufacture of nonwoven fabrics. They're providing manufacturers with an economical means of using waste fabrics, heretofore nonrecoverable. . . . p. 30

•

The appetites of fuel consumers may become more versatile. One estimate is that substitution of fuels is possible in "at least 65% of energy utilization." . . . p. 9

•

Residual feedstocks can be improved substantially by removing the asphaltenes first. Engineers have found that pentane is better for this purpose than propane. . . . p. 33

•

Bigger shipments of LPG from the Middle East can be anticipated this fall. Two terminals designed to load refrigerated cargoes are being completed at Ras Tanura, Saudi Arabia, and Mina al Ahmadi, Kuwait. . . . p. 42

•

Production of chlorinated hydrocarbons will boom in the '60s. That's one of the predictions made at this week's meeting of the American Institute of Chemical Engineers. . . . p. 32

•

The Sacramento Valley gas hunt will focus on the F sands this year —with the Colusa Basin a principal target. Drilling in this pay in the past 13 months has paid off handsomely. . . . p. 19

•

Phillips Petroleum Co. will resume wildcatting in Central America with an offshore test in British Honduras. It will be the region's first drilling venture in nearly two years. . . . p. 38

•

Italy's crude imports from Russia will include a substantial volume for independent refiners, as well as for the state-owned ENI group. A new trade pact covers a total of 4-million tons—roughly 14% of Italy's 1961 crude needs. . . . p. 38

•

American Overseas Petroleum, Ltd., is seeking a buyer for the production rights to its Kahta field in Turkey. While the field is producing oil, the crude is very heavy—11.2-gravity. . . . p. 37

•

Early results are encouraging in Texas' first carbonated waterflood. This is the one in Pecos County that was started last November . . . p. 21

Up to the Minute

SIGNIFICANT LATE NEWS

AT-A-GLANCE Copyright PETROLEUM WEEK

March 3, 1961

President Kennedy indicated strongly this week that import controls will be continued on residual fuel oil. He did not rule out chances for modifications in the control program, but he told a midweek press conference that there is a need to "reach a balance" among the interests of domestic producers, East Coast consumers, and the coal industry.

•

Congress will make an attempt to extend coverage of the minimum wage law to crews of U. S.-owned ships under foreign registry. That was predicted by Rep. James Roosevelt (D., Calif.), who said that extending the coverage will be complicated. Such a move would greatly strengthen the National Labor Relations Board's recent ruling that it has jurisdiction over labor disputes on such "flags of convenience" vessels.

The plan for minimum-wage coverage for service station employees has been altered. Roosevelt's special labor subcommittee this week passed on to the full Labor Committee a bill that would limit coverage to companies grossing $1-million annually. An earlier proposal would have included all service stations grossing $250,000 or more annually.

•

Phillips Petroleum Co. established a Baltimore marketing division this week, another step in its invasion of the East Coast. The company, which markets almost exclusively through jobbers, is aiming at converting competing jobbers to its brand. One official predicted that Phillips will have 1,000 stations selling its products from northern Virginia to southern New Jersey in three years.

•

The minimum royalty on oil and gas production on Indian lands was increased from 12½% to 16⅔% by the Interior Dept. this week. John O. Crow, acting commissioner of Indian Affairs, recommended that a higher rate should be used in areas of "strong competition."

•

President Kennedy's highway financing proposals will get an early hearing in Congress. House Ways & Means Committee Chairman Wilbur D. Mills (D., Ark.) scheduled hearings on the tax plans (page 10) to start Mar. 14.

•

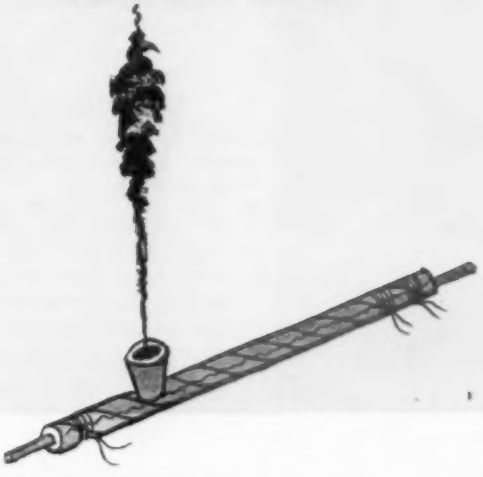
Humble Oil & Refining Co. reported this week that it is still short of its crude requirements for March. The company said it desired to buy 41,000 b/d of spot crude in Texas this month above its normal purchases. Humble has received "several" offers of out-of-state crude, but an official said, "We are still far short of what we desire."

•

Petroleos Mexicanos says its sales of residual fuel oil in the U. S. now average 50,000 b/d to seven customers. Earlier this year the Mexican government company reported its resid sales in the U. S. as 30,000 b/d.

No Like 'Um Big Pipe!

Then Welex's TUBINGLESS Completion Services Are For You



Development of tubingless completions—where tubing becomes casing or standard pipe—made necessary many new completion techniques.

Welex's Tubingless Completion Services offer you by far the most complete selection, whether your well is a single or multiple completion.

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- Welex Link-Jet*
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- Radioactivity Orienting
- Correlation Gamma Surveys
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- Jet Tubing Cutter
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HUMBLE

Power Market Fuel Rivalry to Increase

Electric generation plants, with a high degree of fuel interchangeability and a fast-growing demand for energy, will be a strongly competitive field for fuels.

Interchangeability of fuels in the U.S. is possible in "at least 65% of energy utilization."

That's the conclusion reached by W. Gibson Jaworek, petroleum economist of Ohio Oil Co., and John J. Schanz, Jr., associate professor of mineral economics at Pennsylvania State University. Their findings were presented this week at the annual meeting of the American Institute of Mining, Metallurgical & Petroleum Engineers in St. Louis.

The future intercompetition of fuels will vary among major consuming sectors, but the strongest rivalry is expected to be in the field of electric generation.

In that field, Jaworek and Schanz predicted, "fossil fuels will have to reckon with one another as well as with atomic energy."

The four energy-consuming sectors defined in the study of energy interchangeability are: industrial (which uses 33% of the total energy consumed in the U.S.); electric generation (20%); residential and commercial (21%); and transportation (26%).

In those fields, the two economists found, interchangeability of fuels now amounts to 14.3% of the energy consumed.

There is "feasible interchangeability" of an additional 50.8% of the energy utilized, they said. For the remaining 34.9% of energy utilization, it is considered impractical to use substitute fuels.

"The industrial and electric generation categories [of energy consumers] provide the best possibilities for fuel substitution," Jaworek and Schanz reported.

"With such a fluid market for energy, it can be expected that intercompetition of fuels in the future will be intensified particularly in energy sectors which show the most growth potential," they observed. "Foremost in this group is electric generation."

A decline in the rate of growth of total energy consumption in recent years indicates that energy suppliers will try to capture markets from other suppliers to expand sales, rather than depend primarily on over-all growth in use.

The two economists, in giving that warning, noted, "Theoretically, any energy source could capture in one year all markets which display existing interchangeability.

"Over a span of one or two decades, any energy source could theoretically capture all of the markets classified under feasible interchangeability, another 50.8%."

Of the 34.9% of the energy market in the "impractical" interchangeability category, according to the study made by the two economists, petroleum holds approximately 26% and bituminous coal holds 9%.

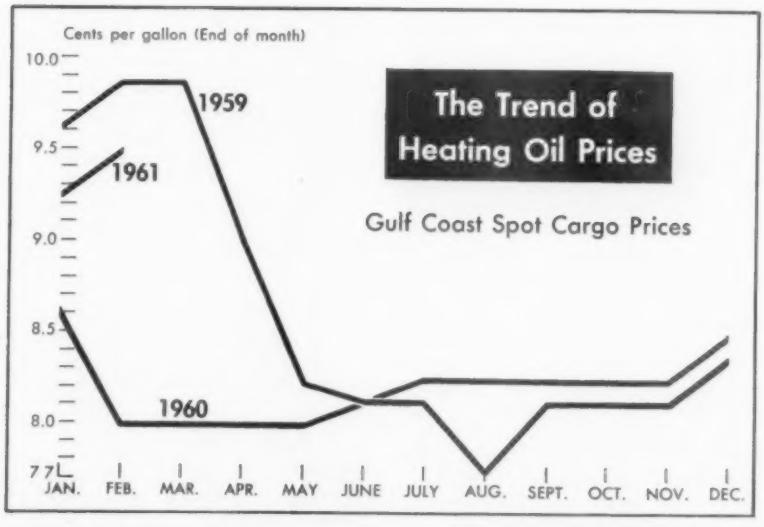
The study of the U.S. energy use pattern was based primarily upon a detailed analysis of fuel consumption, existing fuel substitution, and potential interchangeability of energy in Pennsylvania.

The future growth of any fuel in competitive markets depend upon price and supply, two factors that are influenced by political and legislative activities, according to a Gulf Oil Corp. spokesman.

Such factors, Eugene F. Eisemann, Jr., told the AIME interfuel session, include import restrictions and regulation of natural gas sales.

"Presently, the price of natural gas is artificially low because the field price is not permitted to seek a competitive level in the open market," he said. "Prices of residual fuel oil are artificially high because of import restrictions."

Like Ohio Oil's Jaworek and Penn State's Shanz, Eisenmann noted that



Heating Oil Prices Are Softening

Interior Secretary Stewart L. Udall's concern about "runaway" heating oil prices may be short-lived: Prices are showing signs of softening.

In the Mid-Continent refiners are offering No. 1 and No. 2 fuel at discounts, a move that could spread to the Gulf Coast.

Prices so far this year are somewhat higher than depressed 1960 levels, but they still have not recovered to more normal 1959 rates (chart).

Heating oil prices on the Gulf Coast in February averaged 1.5¢ a gal. above last February, when the unusually mild weather made heating oil a drug on the market. But they are still averaging 0.4¢ below February, 1959.

the field of electric generation offers the greatest growth potential in fuel consumption.

Presently, he observed, 44% of the coal, 12% of the residual fuel oil, and 14% of the natural gas used in the U.S. is consumed in electric power generation plants.

In analyzing the use of fuels by electric power plants in several areas of the country, Eisemann predicted that if gas were made available in large amounts, "its share of the market would increase sharply, assuming that price relationships with both coal and oil remained unchanged."

The petroleum industry is settling down from its era of "glamourous" growth to a steady, "realistic" pace, says Northern Natural Gas Co.'s Raymond W. Miller.

Miller told AIME's Society of Petroleum Engineers: "Working against faster growth are various factors, including increased competition from other types of energy, slower sales of new cars, traffic congestion, wider use of small automobiles, increased taxes, and increased production costs.

"Realism requires that the industry understand it is not experiencing a short-range readjustment discomfiture, but a period of lowered sights, close figuring, and cautious planning."

In another report, Wallace W. Wilson, of Continental Illinois National Bank & Trust Co., Chicago, analyzed the growing trend of company amalgamations and purchases of outright producing properties (PW—Dec.30'60,p18).

"To many prospective purchasers," he said, "the only consideration is whether a deal can be financed, not whether it fits in with or improves the average quality of their current operations."

The incentive for gas producers to risk capital for necessary exploration must be provided through higher wellhead prices if potential demand for gas is to be met.

That's the deduction of David T. Searls, senior partner in the Houston law firm of Vinson, Elkins, Weems & Searls.

He told the SPE production review session that, "assuming average wellhead prices reach 14¢ per Mcf. during the next few years, income would just about equal expenditures" which should be made if a proper exploration program for gas is to be conducted in the U.S.

"Courts of the land," he said, "are still comparing prices for gas on the basis of distress prices paid during the '30s, when interstate markets as we know them today simply did not exist."

Kennedy Wants Tax Hike

The President proposed a financing plan this week to complete the interstate highway system by 1972 with higher user taxes. He wants to retain the fourth cent of the federal gasoline tax, due to expire June 30, and boost these other levies:

	Present	Proposed
Diesel fuel	4¢ a gal.	7¢ a gal.
Trucks (over 26,000 lb.)	$1.50 per 1,000 lb.	$5 per 1,000 lb.
Tires	8¢ a lb.	10¢ a lb.
Inner Tubes	9¢ a lb.	10¢ a lb.
Tread rubber	3¢ a lb.	10¢ a lb.

President Kennedy recommended this week that Congress continue the 4¢-a-gal. federal gasoline tax beyond June 30, and that it nearly double the tax on diesel fuel, to provide additional financing for the interstate highway system.

He also called for increased levies on tires, inner tubes, and tread rubber, and on trucks weighing more than 26,000 lb.

In a special message to Congress, the President said these revenue measures are necessary to raise the extra $9.7-billion that is needed if the 41,000-mi. interstate road network is to be completed on schedule in 1972.

Without the extra money, he said, the program, begun in 1956, would have to be stretched out to 1977. And he declared himself "unalterably opposed" to any stretchout or cutback.

Under present law, the fourth cent of the tax on gasoline, diesel, and other motor fuels would drop to 3¢ a gal. on June 30.

Kennedy provided the industry some balm by backing away from a recommendation made by former President Eisenhower in his last budget message to Congress, in January. Eisenhower urged that Congress not only cancel the scheduled drop to 3¢ but hike the federal gasoline tax to 4½¢.

Kennedy hinted strongly that he too would like to see the higher tax rate imposed. He said he refrained from asking for a 4½¢ rate only because he did not want to raise taxes on the general consumer "at this time," with the nation in a recession. Otherwise, he said, the higher tax would be "clearly acceptable and would have my support."

Although he did not say so, Kennedy undoubtedly took into account Congress' previous strong opposition to a 4½¢ rate. It twice rejected Eisenhower's plea, settling for a 4¢ tax, which was to be "temporary" to June 30.

One representative of a major company thinks it would be "an awful mistake" for the oil industry to fight the 4¢ extension.

He points out that many states would be standing by to impose an extra cent if there were a 1¢ reduction from the present federal level, so "it really won't make much difference anyway."

"Let's face the facts," he says. "We hate to see the tax continued at 4¢, but the highway program has got to be financed, and the better highways we have, the more gasoline will be sold."

He predicts that there will be no all-out fight against the highway package from the oil industry, but perhaps "some token opposition, just for the record."

A more serious fight might have been considered, he believes, if Kennedy had asked for the extra half-cent. But since the fourth cent is already in effect, he says, it will be hard to argue against it.

Kennedy's program is now in the hands of the House Ways & Means Committee, which is expected to begin hearings soon. His top advisers on the highway program and on tax matters conferred with committee leaders before the special message was sent to the full Congress.

Speaker Sam Rayburn would not commit himself on the President's proposals. He said only: "I am wait-

or Pay-as-You-Go Highway Plan

ing to get the best bill possible out of the committee. I hope we can all get together on this thing."

The scheduled expiration of the fourth cent of the gasoline tax would deprive the special Highway Trust Fund, from which interstate highway construction is financed, of an estimated $600-million annually. This would be offset, under present law, by a diversion of a portion of federal excise taxes on automobiles, parts, and accessories from the Treasury's general fund into the highway fund (as often recommended by oil companies, whose customers already carry a heavy share of highway financing).

This diversion would provide $800-million to the highway fund, but would continue for only three years.

Kennedy called the diversion, plus the scheduled reduction in the gasoline tax, "fiscally unwise." He said removing $800-million from the general fund would amount to "deliberately unbalancing" the budget. And he said there undoubtedly would be "precedents and pressures" to continue the diversion beyond the next three years through 1972, when the highway program is supposed to be completed. This, he said, would cost general taxpayers approximately $10-billion.

Kennedy's plan, aside from keeping the gasoline tax at 4¢, is to hike five other taxes already earmarked for the highway fund (table, page 10).

Kennedy said these increases would fall mainly on heavier trucks that use diesel fuel. They would provide $300-million in new revenue annually, approximately the same amount a half-cent rise in the gasoline tax would provide. The fourth cent of the gasoline tax brings in $600-million a year.

Kennedy also made two other major proposals to Congress:

- He asked that receipts from the aviation gasoline tax, which now go into the Highway Trust Fund, be shifted back to the General Treasury. He said this tax, expected to provide $22-million in revenue in the new fiscal year, "is not a highway use tax in any sense." He did not propose, as had Eisenhower, that a tax be imposed on aviation jet fuel, now untaxed.
- He asked for an increase in the authorization of funds for primary, secondary, and urban roads that feed into the interstate system. He recommended that this authorization—now at an annual level of $925-million—be increased by $25-million every two years beginning in 1964 until the $1-billion level is reached and maintained.

Kennedy rejected several alternative proposals advanced by various groups to provide additional revenue for the highway program.

He said he did not favor abandoning the pay-as-you-go method of financing, or issuing special federal highway bonds, or charging tolls "on roads that ought to be free."

He also rejected the idea of spreading the tax burden to include more nonusers in lieu of increasing the burden on users. (Nonusers are those who benefit indirectly from the highway system, such as business establishments, land owners, etc.)

He acknowledged that a recent Bureau of Public Roads study concluded that 8% of the interstate system's benefits would accrue to nonusers. But he said this is open to "serious challenge."

Aside from this, he said, the Trust Fund already receives nearly $60-million in annual income from nonusers. And another $140-million worth of other road programs, which benefit users, are financed not by the Highway Trust Fund, but out of general revenues which nonusers support.

Kennedy said it is only fair that heavy trucks pay a greater share of the highway tax burden. He said numerous federal and state studies have concluded that they should.

He noted that the size and weight of tractor-trailer combinations require a thicker surface, wider pavement and shoulder, more careful grading, and more expensive bridges. On top of this, he said, these heavy vehicles are the primary beneficiaries of the new highways in terms of ton-miles traveled.

They gain from the use of less fuel, less depreciation, fewer accidents, shorter distances, and less traveling time, the President said.

Kennedy told Congress that, if it does not accept his proposals, it "should be prepared to increase gasoline taxes on all users" to the 4½¢ level.

"What is essential," he said, "is that one alternative or another must be adopted to raise the revenue the [highway program] needs to go ahead as scheduled without draining general revenues."

Udall Backs House Fuels Study

A national fuels study conducted by a special committee of the House of Representatives wouldn't be unfair to coal, or any other group, Interior Secretary Stewart L. Udall said.

Udall welcomed the proposal backed by House Speaker Sam Rayburn, because his department is in the position of having to make difficult decisions without benefit of guidance on policy from Congress.

Udall also promised that personnel changes will be made in the Office of Oil & Gas and in the Oil Imports Administration.

J. R. Parten, consultant to Udall, is working on personnel matters of these two offices, with the idea of strengthening them, Udall said.

Capt. Matthew V. Carson Jr., present head of the Office of Oil & Gas, has submitted his resignation.

Udall also endorsed the recommendation President Eisenhower sent Congress in his budget message for transfer of Naval Petroleum Reserves to the Interior Dept.

Lawrence J. O'Connor, Oil Import Administrator, meanwhile, predicted "a changing attitude toward oil" in the Interior Dept. under Secretary Udall.

"Udall has taken—and, I am sure, will continue to take—an increasing role in petroleum affairs, one far greater than any of his more immediate predecessors," O'Connor told the Society of Petroleum Engineers of the American Institute of Mining & Metallurgical Engineers this week.

O'Connor predicted that decisions on oil will be made "with greater public participation, with greater public awareness of their impact on our society, and in the larger frame of reference of the greater public interest."

"Decisions will be made forthrightly, with no illusion that compromise can substitute for determination," O'Connor said.

"The motivating factor behind the oil import program," O'Connor continued, is the view that "responsible and forward-looking government must take an active role to assure that adequate supplies of petroleum are available at the places they are required—at fair prices to consumers and with fair profits to producers."

Computers Expedite Bid Analysis, Military Says

The first large-scale award of oil-purchase contracts from electronic computers by the Defense Dept. is now being made by the Military Petroleum Supply Agency.

The awards, totaling about $200-million, cover the requirements of all services for JP-3 and JP-4 jet fuel for the period from July 1 through Dec. 31. Bids were asked under invitation 61-61 on Dec. 16, 1960.

When bids were opened on Jan. 18, 95 companies had offered 3-billion gal. of jet fuel to cover the 2-billion-gal. requirement for 317 bases and storage terminals in the U.S.

MPSA aides estimate a saving of $1-million compared with bidding evaluated entirely by department buyers. However, they say the time saving is even more significant.

To avoid errors in the first actual use of the computers, the work wasn't rushed. But machine evaluation made it possible to award bids two weeks earlier than would have been possible with manual operation.

MPSA believes that, in the future, both bidders and the Defense Dept. will benefit from pushing the date of awards back so suppliers will have more time to plan their refinery runs before the delivery date.

The bids were computed on machines in other departments, on which MPSA rented time. Until MPSA is able to prepare more of its buying programs on machines, there would be no economy in leasing them for MPSA alone, officials say.

The computers combined 95 offers from nearly 200 shipping points—complicated by such things as discounts, escalation, and shipping restrictions—with 4,100 point-to-point transportation rates for ship, barge, truck, rail, and pipeline.

First, the lowest-cost routes were determined; then all bids were evaluated on a laid-down price basis.

More than 40,000 instructions were fed into the IBM 704 and 7090 computers, which performed some 500-million calculations to come up with the answers. Awards will go to 85 companies.

The $1-million estimated saving was attributed mainly to the computers being able to find the lowest-cost pattern of distribution, by considering many more possible transportation combinations than had been feasible by hand.

Depletion Sought for Underground Water

Percentage depletion for underground water used for irrigation is being sought by a Floyd County (Tex.) farmer.

He filed suit in U.S. District Court in Lubbock last week, contending that water under the High Plains of Texas is a natural deposit, and is being exhausted just as oil, gas, gold, or any other natural deposit. Therefore, he argues, underground water should come under the federal law that allows an income tax deduction for depletion of other resources.

Mecom Wins Yemen Concession

Texas independent John W. Mecom is tackling an exploration venture in the Red Sea kingdom of Yemen in his first move into the Middle East.

Mecom has been granted a 10,000-sq. mi. concession on Yemen's coastal plains and offshore waters, following negotiations with the Yemen government in late January, Mecom's Houston office confirmed this week.

The concession provides for a five-year exploration period and a 30-year development period. Profit-sharing with the Yemen government will be in the neighborhood of 50-50.

Mecom expects to start exploration later this month in Yemen.

Vehicles, planes, and exploratory equipment were shipped out of Houston early this week, and drilling equipment will follow within a month.

Exploratory operations will start around Mar. 25 near a major outcropping salt dome in the area of Salif, a town on the Red Sea. Operating headquarters will also be set up there.

Mecom intends to drill a series of test wells after geophysical and other exploratory work.

Mecom's venture is the third successive American attempt at exploration in Yemen, where no drilling has yet been done for oil or gas.

The concession granted to Mecom had formerly been granted in late 1959 to Overseas Investment Corp., formed by a former State Dept. officer in the Middle East, along with businessmen from Oklahoma, Texas, and Louisiana. That grant was reportedly considered canceled months ago, though there has been no official indication of the reasons.

Before that, a much larger, 40,000-sq. mi. oil and mineral concession had been granted in 1955 to Yemen Development Corp., formed by U.S. investment specialists. Only preliminary surface work had been done before this grant was canceled.

A German independent, the only company that came close to drilling in Yemen, bowed out in 1956 following disagreement with the government.

Seek Change In Smog Rule

Los Angeles officials were asked this week to modify their ban on the use of residual fuel oil during the six warm months of the year.

Oil company representatives, under sponsorship of the Western Oil & Gas Assn., made a clinical attack on Rule 62, which prohibits the burning of fuel oil containing more than 0.5% sulfur during the summer period if gas is available.

They told the County Board of Supervisors that the rule is inequitable and unfair, and might establish a dangerous precedent for all business in the county.

An amendment was proposed that would permit year-around use of fuel oil except for any period in which control officials felt that the sulfur dioxide content of the air was approaching a level considered to be dangerous.

The oil men suggested that the safety standards could be determined by the State Dept. of Health, and could be invoked by Air Pollution Control authorities.

They also agreed to make the switch of fuels—from oil to gas—compulsory when a smog attack was expected.

They buttressed their presentation with testimony of several experts that the burning of fuel oil would have no adverse effects on the health of the community's residents or the vegetation.

Oil men said that the proposals offered by the industry would provide greater flexibility in smog control.

Courts Will Govern Texas Fracturing

A Texas Supreme Court decision on reservoir fracturing raises this question for oil men and lawyers alike: Will it have a tendency to put a damper on small-tract drilling?

Few attorneys and company men had ready answers for this one, and even those who discussed it privately didn't agree on whether or not it would have any substantial impact on townlot drilling.

Most persons backed away from formal comment until they have had an opportunity to read the text of the high court opinion that upheld the Austin Court of Civil Appeals.

The case went to the high court early last month (PW—Jan.13'61, p36).

The latest ruling held that the courts rather than the Texas Railroad Commission have the authority to govern disputes over fracturing of subsurface oil and gas reservoirs.

Three test cases were involved.

A. W. Gregg owned two wells and Christian R. Holmes a third that were drilled into the Hensen reservoir on townlot tracts in Pharr, Hidalgo County.

When they sought to increase production with sand fracturing, Delhi-Taylor Oil Corp. filed suit to stop them on the ground that gas in its adjacent leases would be confiscated.

The Gregg-Holmes wells were within 50 ft. of other wells in the area.

The issue raised was whether the courts or the Railroad Commission had controlling authority. The San Antonio Court of Civil Appeals voted 2-to-1 in favor of the Railroad Commission, but this was reversed by the Austin Court of Civil Appeals.

The Supreme Court ruled that the dispute which triggered the court test involved a definite issue of trespass.

Said Associate Justice Joe Greenhill in the formal opinion:

"The invasion alleged is direct and the action taken is intentional.

"Gregg's well would be, for practical purposes, extended to and partially completed into Delhi-Taylor's leasehold.

"While the drilling bit of Gregg's well is not alleged to have extended into Delhi-Taylor's land, the same result is reached if, in fact, the cracks or veins extended into its land and gas is produced therefrom by Gregg."

Lawyers representing Gregg and other small-tract owners had argued that regulations governing sand fracturing would lack uniformity and would be subject to various court interpretations unless the Railroad Commission had supreme authority.

The high court opinion noted, however, that the commission itself has never asserted power to pass upon questions of subsurface trespass.

One company spokesman interpreted the decision as an indication that the courts may reassert authority over regulatory matters.

"The courts for some time now have abandoned intervention into conservation practices and have turned all of these matters over to the commission," he said. "I think it is good any time the courts will assert themselves in any matter, regardless of what it is."

Another company official expressed satisfaction with the ruling, terming it "a wise decision."

American Oil to Cut Work Force

American Oil Co. is cutting its work force at two refineries due to modernization.

The layoffs will affect 450 operating and maintenance workers at the company's Whiting (Ind.) refinery, and 69 employees at the Casper (Wyo.) refinery by year's end.

Amoco told employees that the growing surplus in the refineries' work force "has been brought about mainly by replacement of obsolete equipment with modern equipment that needs less repair and maintenance service and can be operated with fewer men."

Last October, 313 employees were laid off at Whiting, a move also attributed to modernization.

Timing of the layoffs will depend on the number of workers leaving voluntarily, how fast the company's workload diminishes, and the time needed to reassign and retrain employees. The company will accept voluntary applications for severance from hourly-payroll employees, regardless of plant service dates.

Older employees whose skills can be spared may choose to leave with severance as soon as possible.

Meanwhile, Charles Hallum, president of the Independent Petroleum Workers of America—representing Whiting workers—has submitted proposals that "may alleviate" the seriousness of the layoffs.

Details will not be disclosed, however, until the union hears from Amoco. A reply is expected next week.

East's Petrochemicals Look Good

East Coast refiners are becoming increasingly bullish on their petrochemical future, according to Herman K. Nieuwenhuis, president of Chemical Products Associates, Inc.

Nieuwenhuis told the American Institute of Chemical Engineers in New Orleans this week that Atlantic seaboard refiners "have various petrochemical aces up their sleeves."

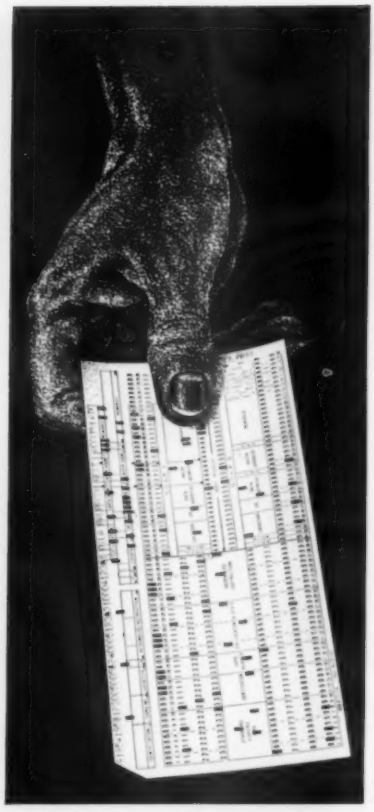
Some of these, he said, are abundant sources of refinery gas, and the use of petroleum coke as a "low-cost source" of heat "for petrochemical plants built across the fence."

The tempo of expansion, particularly in New Jersey, Delaware, and the Philadelphia area of Pennsylvania, is picking up steadily, he said.

Nieuwenhuis listed these current projects for the refining symposium:

- A 70-million-lb.-per-year cumene plant recently put on stream by Texaco Inc. at Westville, N. J.;
- An 80-million-lb.-per-year polypropylene plant announced by Shell Oil Co. for Woodbury, N. J.;
- Two maleic anhydride plants in the 20-million-lb.-per-year category "well on their way to completion" at Fords and Elizabeth, both in New Jersey;
- A phthalic anhydride plant for Monsanto Chemical Co. at Gloucester, N. J.;
- A 225-million-lb.-per-year ethylene plant at North Clayton and a 100-million-lb.-per-year naphthalene plant under construction at Delaware City, both in Delaware;
- A 40-million-lb.-per-year oxo alcohol plant for Gulf Oil Corp., presently under construction at Philadelphia.

Nieuwenhuis conceded, however, that even though great strides have been made in the past decade, East Coast output is still modest compared with the Gulf Coast.



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What's New / IN THE INDUSTRY

Crude allowables in Louisiana and Oklahoma were increased for March, while North Dakota's was lowered, and Kansas' remained steady. Louisiana's allowable has been set at more than 1-million b/d for the first time, at 1,015,531 b/d for March and April. This is 18,414 b/d above the current allowable. Oklahoma's minimum per-well allowable for crude was increased to 19 b/d from 17 b/d.

The March allowable in North Dakota was set at 72,850 b/d—down 1,320 b/d from February's record of 74,170 b/d. The Kansas allowable for March has been set at the same level as February—315,000 b/d.

•

Liquid output from gas processing plants in 1961 will reach a new high, averaging more than 1-million b/d. This, said Charles E. Webber, president of the Natural Gasoline Assn. of America and director of Sun Oil Co.'s natural gas administration, will probably cause adverse reaction in other industry segments. Webber made the prediction at the first regional meeting of the NGAA's new Southwest Louisiana chapter, in Lafayette.

•

A bill requiring a minimum 14-day producing schedule in Texas has been introduced in the legislature. Its sponsors blame low producing schedules set by the Texas Railroad Commission for the loss of markets for Texas crude. The commission's chairman, William J. Murray, Jr., has called the bill "unnecessary," adding that the agency will be happy to increase crude allowables if market demand justifies it.

•

Phillips Petroleum Co. has asked the Justice Dept. to outline areas where acquisitions can be made without running afoul of antitrust laws. In filing an answer to a federal antitrust suit, the company admitted that it had purchased Union Oil Co. of California stock from time to time, but denied that the stock ownership would have anticompetitive effects.

•

Slick Oil Corp. stockholder approval is all that's needed before the company is sold to Midhurst Oil Corp., Houston. More than 270 producing wells are involved in the purchase. Slick properties include some 57,000 producing and 45,000 nonproducing acres, plus an interest in a gasoline plant and gathering system in St. Landry Parish, La.

•

Plans for Dresser Industries, Inc. to buy Reed Roller Bit Co. have been called off. No reasons were given by the two companies. An exchange of stock had tentatively been approved by directors of both companies (PW—Jan.27'61,p6).

•

Roy J. Diwoky will become president and chief executive officer of Crown Central Petroleum Corp. He has been chairman of the board of Commonwealth Oil Refining Co., and will succeed S. K. Waters at Crown Central. Waters will become chairman of the executive committee.

Ray C. Adam has been named vice-president and general manager of manufacturing for Mobil Oil Co., a newly created position. He was formerly manager of planning, analysis, and economics for Socony Oil Co. He succeeds William H. Montgomery, who is retiring.

Gas reforming hits a new high Engineering news was made in France recently, when a Chemico high-pressure gas reform furnace operating at 250 psi was placed on stream. Prior to the completion of this project, no gas reformer in the world had ever operated at pressures above 175 psi. Design innovations incorporated in this plant reduce compression requirements and increase heat recovery.

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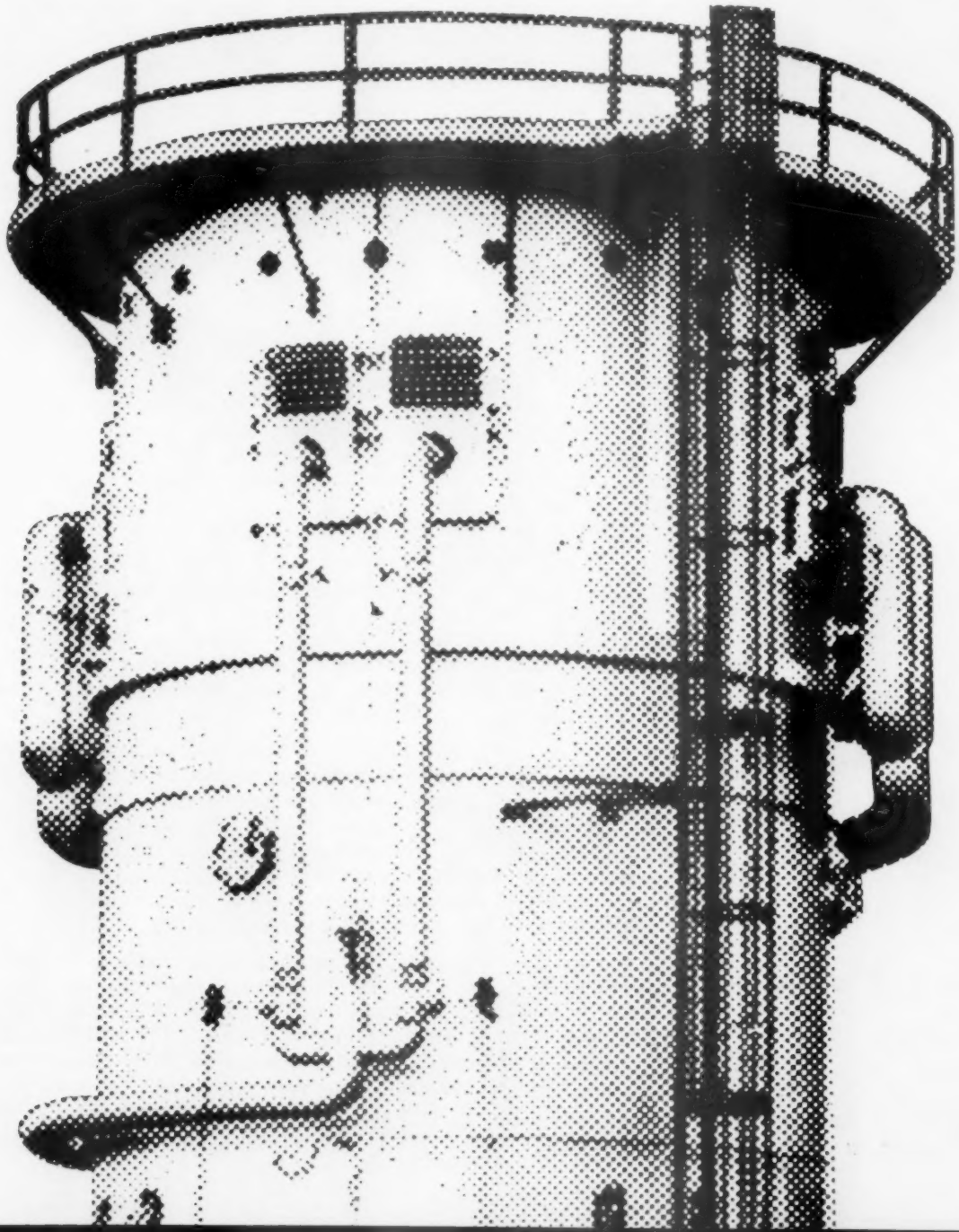

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
March 3, 1961

House Speaker Sam Rayburn settled the national fuels study issue by giving all interests something. Rayburn was caught between his own reluctance to make a study, and his obligation to President Kennedy, who wanted one. The solution, creating a 15-member select committee of the House of Representatives, helped the Administration keep a pledge, but left Rayburn in complete control of the study group. Had the earlier proposal for a joint committee of the Senate and House been adopted, Rayburn's control would have been limited, and the Senate members would have gained the lion's share of attention.

The prospect is that the House will conduct the only formal study. Sen. Clinton P. Anderson (D., N.M.), Senate Interior Committee chairman, doubted the need for the study. With the House taking the lead, pressure on Anderson to back a study by the Senate was removed. And with the House moving ahead, the Administration is likely to feel obligated to cooperate with Rayburn's efforts.

Oil spokesmen who had agreed to an "objective" study feel they will get one from Rayburn. Coal spokesmen appear less than pleased, however, and will be fighting to make certain their interests are adequately represented on Rayburn's group. Coal leaders have been slow to react publicly to the select committee approach, but one said that if oil men regard it as a victory for them, it is only because they expect a packed committee. Coal representatives, however, were pleased with the language of the study resolution, which calls for "an effective national fuels policy."

Coal is getting advice from significant sources. Two men who have been advising Joseph E. Moody's National Coal Policy Conference: Elmer F. Bennett, Under Secretary of the Interior under President Eisenhower, and Maurice Rosenblatt, a public relations man who also represents the National Committee for an Effective Congress, a group that backs liberals in both parties.

•

The courts will uphold area-pricing for gas producers, Federal Power Commission Chairman Jerome K. Kuykendall believes. He thinks the courts "gradually are becoming more aware" of the problems of producer regulation, but adds that "the issue is not free from doubt," and legislation to prescribe area-pricing is still "highly desirable." He still would oppose legislation that barred FPC from considering producer costs.

•

Major changes in the Rock Springs project to move more gas to Southern California embarrassed FPC, which had approved the proposal on the basis that the gas supply was needed soon. At the bidding of the California Public Utilities Commission, the backers, the Pacific Lighting System companies and El Paso Natural Gas Co., altered the project to reduce gas prices by postponing the proposed completion date of the pipeline until 1964. Consequently, FPC called a new hearing.

The backers of the Rock Springs line are anticipating gas sales to Southern California Edison Co. The latter has contracted for its own supply from Humble Oil & Refining Co. and Petroleos Mexicanos. The Rock Springs line's backers are proceeding on the assumption that the latter supply, which would reach California via a pipeline from Texas through Mexico, won't get the necessary approvals.

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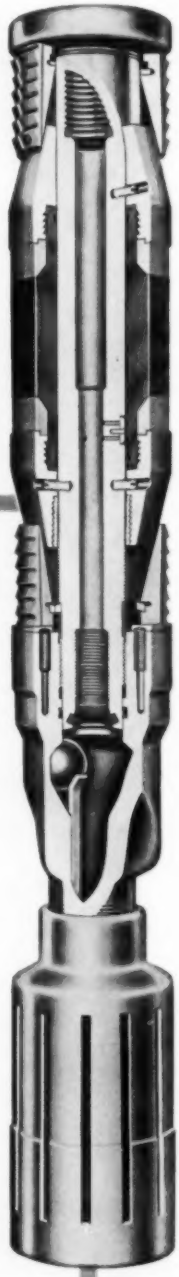

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F Sands: Sacramento Valley Gas Target

Gas exploration in the Upper Cretaceous F sands is expected to trigger another record-breaking year in California's Sacramento Valley.

New records for drilling and completion were forecast by Eugene F. Reid, vice-president and exploration manager, Occidental Petroleum Corp., in a recent talk before the San Joaquin Valley Section, Society of Petroleum Engineers, American Institute of Mining Metallurgical & Petroleum Engineers, at Bakersfield.

Reid said 1960 was the biggest year to date; 240 wells were drilled, redrilled, or deepened—an increase of 39% in total wells drilled and 61% in total footage drilled when compared with 1959, the previous best year.

Significantly, exploratory holes numbered 146, and accounted for over 40% of the total wildcats and wildcat footage drilled in the state. These exploratory tests accounted for 11 new fields, 11 new pools, and 5 extensions, for an over-all success ratio of 1 to 5.4.

One of the hottest F zone gas targets will be the Colusa Basin.

It is estimated that some 40 offsets to producing F zone wells will be drilled there this year.

Drilling to date has led to conclusions that F sands are extremely lenticular in nature; that traps are probably combination structural-stratigraphic, with the likelihood that some are entirely stratigraphic in nature; and that at least a portion of the zone is "overpressured," that is, it exceeds hydrostatic pressures.

Since the zone was not considered a worthy objective during earlier exploration in the valley—because of such factors as depth, cost, low price of gas, and lack of knowledge about sand distribution—there are many unexplored areas that will receive concentrated attention in the near future.

During the past 13 months, drilling for the F zone sands has paid off handsomely:

In January, 1960, Gulf Oil Corp.'s No. 1-A Wilkins Unit opened the Buckeye field, flowing at the rate of 2,910,000 cf/d through ⅜-in. choke and perforations at 8,468-87 ft. To date, five more wells have been added to the field, and one is being completed.

Field wells showed completion rates from 1.5-million cf/d to 8.5-million cf/d. Two edge wells have been abandoned, and the field limits have not been defined.

The discovery at Buckeye was followed closely by completion of Cameron Oil Co. No. 1 Cameron-Armstrong, which opened the Grimes field. Completion was effected through perforations at 6,600 ft. for an initial rate of 9.2-million cf/d. Four wells have been completed since, and the field is shaping up as one of the most significant F zone fields in the Sacramento Valley.

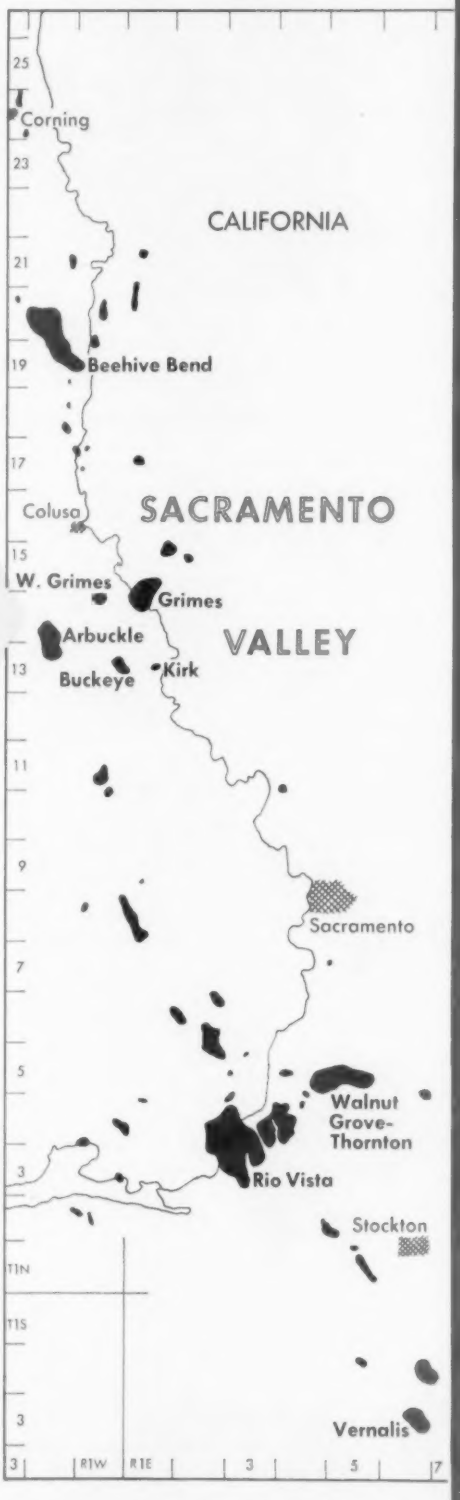
Last October, Gulf scored with discovery of the Kirk field with No. 1 Goff-Erdman. Perforated at the 7,500-ft. level, the well flowed at an initial rate of 3,037,000 cf/d through 18/64-in. choke.

Drilling Will Center Here

In December, another field discovery in F zone sands was brought in at the West Grimes field by Occidental Petroleum Corp. No. 1 Sachreiter. The well was completed for 12,470,000 cf/d through 17/64-in. choke and perforations at the 7,600-ft. level. Shut-in bottom hole pressure was 5,100 psi.

The discovery was immediately offset to the east by Gulf, with a well completed for 11-million cf/d through ½-in. choke. Since then Gulf has completed another. And last week, Occidental brought in another offset, the No. 2 Sachreiter, which flowed 14-million cf/d through a ½-in. choke and perforations at 7,795-810 ft. for a pool discovery. Bottom hole shut-in pressure was 5,545 psi.

Active development of the Arbuckle gas field continued during 1960, with Gulf and Occidental completing 11 wells and adding 1,760 productive acres to the field. Occidental's No. 1-LL Arbuckle Unit was credited as an extension on the northern edge of the field. Production intervals for all new completions in the field ranged from 5,400 ft. to 6,500 ft., with initial



rates varying from 1,170,000 to 10,020,000 cf/d through ½-in. chokes.

During January, in the Arbuckle field, Occidental completed a new pool discovery on the south edge of the field, which flowed in excess of 11-million cf/d on drillstem test. And Pexco, Inc., has since completed a northern offset well.

Another F zone completion early in February was Honolulu Oil Corp. No. 1 Balsdon Unit, which proved up a new field in the College City area. In addition, it is the deepest gas production in the Sacramento Valley. The 10,000-ft. well was completed for 2,240,000 cf/d of gas through 15/64-in. choke and perforations at 9,576-96 ft. Bottom-hole shut-in pressures were in excess of 8,100 psi. This is not only the deepest but also the highest-pressure production established to date in the valley.

In the Dunnigan Hills field, to the south of the Buckeye gas field, Artnell Co., exploring for F zone production not previously established, completed No. 1 Universal-Richey, et al for 2,250,000 cf/d through 5/16-in. choke and perforations at 8,100 ft. for a new pool discovery.

At the end of 1960, Artnell completed the follow-up well, No. 1 RUSA-Lederer Unit for 1,050,000 cf/d through ¼-in. choke and perforations at 8,700 ft. Flow is believed to have been restricted by formation damage. Bottom-hole shut-in pressure was 6,050 psi.

Other gas reservoir rocks due for concentrated attention are the Paleocene sands and the Upper Cretaceous Blewett, Tracy, and E zone sands in the southern portion of the Sacramento Valley.

More than 75% of total cumulative gas production from the valley has come from Eocene and Paleocene sands. A vast potential area is available for exploration, and Paleocene prospects are made more interesting by the fact that many of the early wells bottomed in the Eocene without testing the Paleocene.

Last year, in the Paleocene section, structural-stratigraphic traps with the Midland sand as the objective turned out to be the payoff, with three field discoveries, one new pay, and two extensions.

Reservoir pressures proved to be essentially hydrostatic, as expected, and estimates of extensive reserves are based on imposing sand thicknesses. Few of the discoveries are expected to lead to development covering areas of large lateral extent.

Discoveries included the Bunker field by G. E. Kadane & Sons; Liberty Island field by Reserve Oil & Gas Co.; Grand Island field by Amerada Petroleum Corp.; a deeper pool at Cache Slough field by Standard Oil Co. of California; and extensions at Thornton field by Stancal and at Bunker field by Amerada.

Follow-up drilling to last year's discoveries and new exploration should spell further activity for the Upper Cretaceous Blewett, Tracy, and E zone sands.

The First Tracy sand was tapped last year by Great Basins Petroleum Co. for discovery of the McMullin Ranch field, which presently has 11 producing wells, including 7 for Great Basins, 3 for Signet Operating & Exploration Co., one of whose wells opened a deeper pool in the Second Tracy sand, and 1 for Gulf.

The field has proved to be of significant lateral extent already, and has exceptionally high reserves per acre because of the multiple productive sands present.

Operating in the Sacramento Valley is not without its problems. One is that logistics are complicated, when compared to established oil basins in California.

The main reason for this, Reid said, is that suppliers and service companies have not caught up with the movement of operators into the valley. At present, virtually all supplies are purchased in Bakersfield, Ventura, or Los Angeles, and freighted north.

This requires a great deal of foresight and planning on the parts of both contractor and operator. There have been instances of poor planning where the lack of something as simple as studs for blowout equipment has idled a rig for 24 hours.

Another acute problem is the trucking and crane situation. Good oilfield trucks, cranes, and their operators are a rarity, Reid reported, and those pieces of equipment that are suitable are quite often busy when needed for a move.

Rice paddies, swamps, duck hunters and ferries present problems too. A bad situation arises when a well location falls in a rice paddy, delaying operations until the paddy can be drained and harvested.

The valley is good duck country, too, and many duck clubs under lease require that operations be suspended during the duck-hunting season, causing further headaches in the scheduling of wells.

In the delta and bay area, swampy conditions may make it necessary to drive piling to support the weight of drilling equipment. And when working on islands where supplies and service equipment must be ferried to the location, much planning must be done to keep things on schedule because the ferries cannot handle heavy equipment except at high tide.

On the credit side, once the rig is on location and rigged up hole-making normally comes easy. Soft sediments make a well-planned hydraulics program pay off.

In a recent field development program requiring 6,500-ft. wells, the use of jet bits cut the number of bits used from 14 to 7, and drilling time was cut by one to two days.

Many of the soft sediments can be drilled at rates up to 2,000 ft. an hour. In contrast to these are the rates of 5 to 10 ft. an hour prevalent in shales of the lower F and G zones of the Upper Cretaceous, where bits may make 100 ft. to 150 ft. and come out dull and locked.

Completions and, as a result, well programs have not been standardized to any degree.

During 1960, 24% of all completions used 4½-in. casing; 56% used 5¼-in. casing. Some 25% of all completions were dual-zone, with over 70% of these using only one string of tubing and flowing the upper zone through the casing annulus.

Extreme pressures now being encountered in the F zone pose new problems.

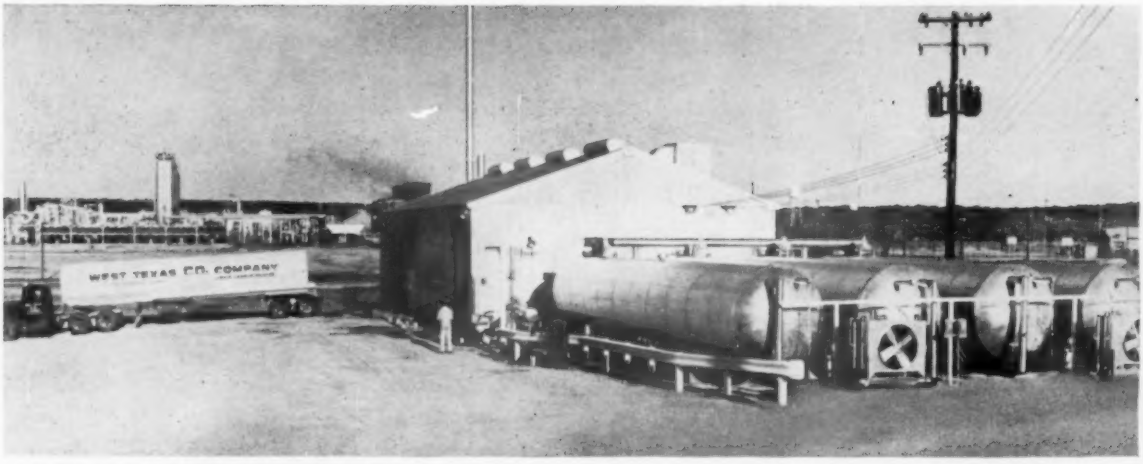
For example, in the No. 1 Sachreiter, Occidental's field discovery at West Grimes, at a total depth of 8,263 ft., 122-lb. mud was required to balance formation pressure of 7,000 psi.

It was necessary to run N-80 grade casing throughout. It is anticipated that deeper drilling will require casing grades of P-105 or P-110.

Valley's High-Pressure Gas Poses Dilemma

The largest purchaser of Sacramento Valley gas is presently reported to be in a dilemma on how to tie in the new field discoveries.

Indications are that tremendous reserves will be established in the area. But at present, no one is able to predict just how large they will be. In addition, these wells will be producing at very high pressures, and if they were tied into the existing systems, they would back all of the older fields off the line.



LIQUEFACTION PLANT—run by West Texas CO_2 Co.—converts CO_2 gas from purification plant (rear) into liquid for injection.

CO_2 Flood Succeeding in Pecos County

Texas' first carbonated waterflood —the Pecos County program operated by Helmerich & Payne, Inc.—is showing signs of success.

American Petrofina Co. of Texas and Oil Recovery Corp. also are participants in the project, which uses the patented Orco carbonated waterflood process (PW—Jul.29'60,p26 and Jul.15'60,p25).

Injection in the White & Baker pool began Nov. 25, 1960. Currently, eight producing and six injection wells on the "N" lease, and 23 producing and ten injection wells on the "B" lease are in the program.

Although it is too early to predict long-range performance accurately, the program's early results have been encouraging.

For one thing, the formation is taking large volumes of the carbon dioxide-water mixture, in contrast to its previous stubborn acceptance of straight water.

It's believed the clay swelled within the formation when straight water was first applied, inhibiting the further introduction of water. Mixture with carbon dioxide has apparently overcome this dilation.

During an earlier waterflood attempt, efforts to push water down six input wells at pressures as high as 1,200 psi. had failed to achieve desired injection volumes.

The injection rate with carbonated water, on the other hand, is averaging approximately 3,500 b/d of water, and 65,000 lb. per day of CO_2.

And there is some evidence that the producing wells are beginning to respond.

LIQUID CARBON DIOXIDE is stored at constant pressure and temperature in insulated tanks. Proportioning pumps push the CO_2 through lines to injection wells.

A company spokesman reports that oil production rates have shown gradual increases during the past few weeks, although significant gains are not expected to be realized until later this spring.

No major difficulties have been encountered with either installation or operation of the lease facilities.

These facilities include two 50-ton-capacity steel tanks, with wall thicknesses of 0.782 in. The tank walls are enclosed in 6 in. of insulation and aluminum sheathing for temperature control.

Tank pressures are maintained at approximately 300 psi., and their temperatures below zero degrees Fahrenheit.

A tank pressure increase resulting from an outside temperature rise causes refrigeration equipment to activate automatically.

Individual proportioning pumps push the CO_2 through ¾-in. lines to each injection wellhead.

Carbon dioxide injection pressure requirements vary widely between wells—from 600 psi. to a maximum of 1,500 psi.

The CO_2 is injected through ¾-in. macaroni string set opposite the top of the Queen Sand formation. The CO_2 mixes with the water, which is injected down the annulus, at the pay face.

Depending upon temperature and pressure conditions, the carbon dioxide may flash into a gaseous state shortly after leaving the proportioning pumps.

Helmerich & Payne currently is utilizing 20 lb. of carbon dioxide per barrel of fresh water.

Oilfield Contractor Frank Turinsky has 20,500 pounds push with his TD-15 Oil Field Special crawler—for fast clearing, digging hard materials, and doing other location jobs. Blade of the 8-foot-wide, outside push-arm dozer is sized to speed pit-digging—"beefed" and braced for tough conditions.

Five-minute "move-outs" are easy for TD-15-equipped contractor Turinsky to make—to hit several locations fast and do them in a hurry. Rig is ready to roll—legally—without "permit" red-tape! Standing, left to right, are Frank Turinsky, and son, Frank, Jr.

"My TD-15 has small tractor advantages yet outdozes anything in the oil fields"

—Frank Turinsky, Mounds, Oklahoma

"This International TD-15 Oil Field Special is the tractor I have always needed," states Contractor Frank Turinsky, Mounds, Oklahoma.

"The 8-foot over-all width is so important in digging pits and hauling legally. I've been using smaller tractors—trying to stretch their ability to 'sub' for a big machine.

"Now we have a tractor that retains all small tractor advantages, yet outworks any other oil field 'dozer.

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Geophysicists Look at Their Problems

Top geophysicists of the U.S. and Canada hold widely divergent views on the current state and needs of their profession.

This conclusion can be drawn from various talks made last week at a one-day conference in Calgary on "Exploration Geophysics—Today and Tomorrow."

The meeting was jointly sponsored by the Canadian Society of Exploration Geophysicists, the Geophysical Society of Edmonton, the Montana Geophysical Society, and the Regina Geophysical Society.

One geophysicist believes increased governmental participation is needed to alleviate some industry problems.

Norman R. Paterson, chief geophysicist, Hunting Survey Corp., Ltd., said the problems facing the industry are occupational, economic, and technical.

"The worst problem," he continued, "is the cyclical nature of the geophysical actvity due to the over-dependence of exploration capital on the business cycle.

"To alleviate this and other problems and to insure a ready supply of skilled geophysical personnel in periods when vital national and international interest is at stake, increased government participation is advocated."

Paterson said this participation should be in the form of: (1) continued regional geophysical mapping (stepped up in periods of low business activity); (2) increased support of basic geophysical research; and (3) trade schools for technicians to service both the prospecting and relating government mapping, defense, and transportation industries.

Severe pruning of executive and managerial staffs employed in exploration departments is recommended by another geophysicist as a remedy for "overorganization."

Graham B. Moody, former president of the American Assn. of Petroleum Geologists and now a consultant in Berkeley, Calif., said that petroleum exploration "is suffering currently from the superabundance of reserves that it has discovered through its efforts over the past years."

Moody added that the profession also suffers from overorganization and "the all too prevalent desire of personnel to get something for nothing; that is, to receive handsome rewards without performing commensurate service."

He sounded an optimistic note, however, in saying that oversupply will be corrected in the future by greater demand. Overorganization can be remedied by the cutbacks in exploration executive and managerial staffs. And the third difficulty can be overcome by each individual "striving to give the utmost in constructive thinking and endeavor to his job."

Despite the increased premium on bigness of operations in current seismic research, there's still room for the small independent who has an original approach and the ability to deliver quality data.

This view was expressed by F. A. Van Melle, manager of Shell Development Co.'s geophysical department in Houston.

"The trend in current seismic research may be described as one of sophistication, of the application of modern analytical and statistical theories to the seismic field," he said.

Van Melle added that there still is room for the enterprising, knowledgeable independent in this field, despite the trend to bigness of operations.

Slim-Hole Multiples Are on Increase

The trend toward multiple well completions inside small-diameter casing was emphasized this week by plans of one Houston independent to use 5½-in. casing for two quadruples and one triple.

The operator, Christie, Mitchell & Mitchell Co., will effect the three-well program in Wise County, North Texas, the same area in which it completed a triple last March inside 4½-in. casing.

Each of the two quadruples will contain three strings of thin-walled 1¼-in. tubing, with no unusual equipment or methods required.

George Mitchell, company president, says the tubing will be run and packers set "in a conventional manner," so that three zones will produce through the tubing strings and one zone through the tubing-casing annulus.

"In fact, we will have more working room in the quadruple wells than we had in the original triple completion," adds Morris Thompson, vice-president.

Indications are that one of the quadruples will produce from four oil zones, while the other will produce from three oil and one gas zones.

One of the quadruples, No. 2 Curtner, some 5 mi. northwest of Bridgeport, was drilled to 5,878 ft. and plugged back to 5,841 ft., with 5½-in. casing cemented to 5,860 ft.

Initial tests indicated production in these perforated zones: 4,070-97 ft., Morris Strawn; 4,640-60 ft., Morris (4,500-ft.) Strawn; 5,420-28 ft., Leftwick (5,400-ft.) Atoka conglomerate; and 5,797-807 ft., Leftwick (5,700-ft.) Atoka conglomerate.

The prospect flowed a total of 825 b/d of oil through ¼-in. chokes, with the Morris (4,500-ft.) Strawn posting the best potential—300 b/d.

CM&M's No. 1 Methodist Youth Camp, 3 mi. northwest of Bridgeport, is expected to produce gas-condensate through perforated zones at 4,005-28 ft. in the Morris Strawn; 5,224-76 ft. in the Tidwell; and 5,272-76 ft. in the Boonsville Bend conglomerate; and oil from the Atoka at 5,114-34 ft.

This venture tested at the rate of 180 b/d for the oil zone and a total of 3.5-million cf/d of gas and 26 b/d of condensate from the three gas zones.

The contemplated triple will be a three-zone oil well.

The No. 1 Rex Bird will be completed in a manner similar to the CM&M No. 6 Tarrant County Water Board (PW—Mar.25'60,p25).

The Houston independent is convinced that economics strongly favor going to triples or quadruples, rather than duals, when it can be done.

It costs the firm roughly $58,000 to drill and complete a dual in the area, with one zone producing through a tubing string and the second zone producing through the tubing-casing annulus, a company spokesman reports.

In contrast, a quadruple can be completed for only $8,000 more—or a total of $66,000, he says.

"Obviously, it is to our advantage to complete them as multizone wells, especially when oil is involved."

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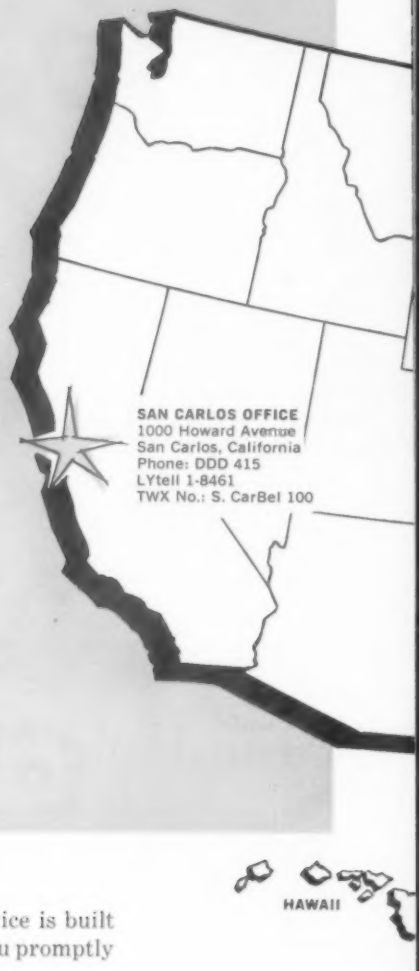

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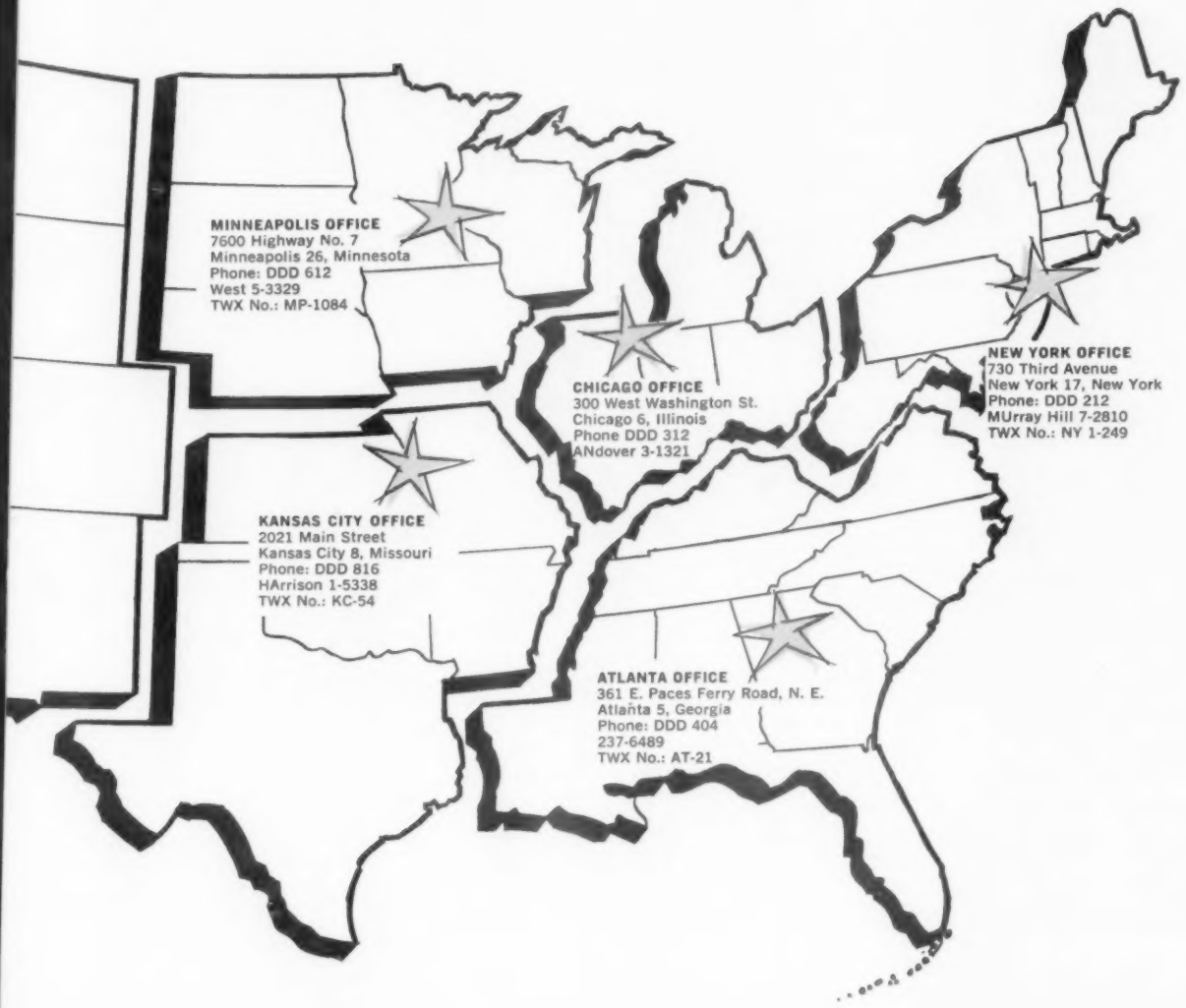

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Log Schools Keep Oil Men Up-to-Date

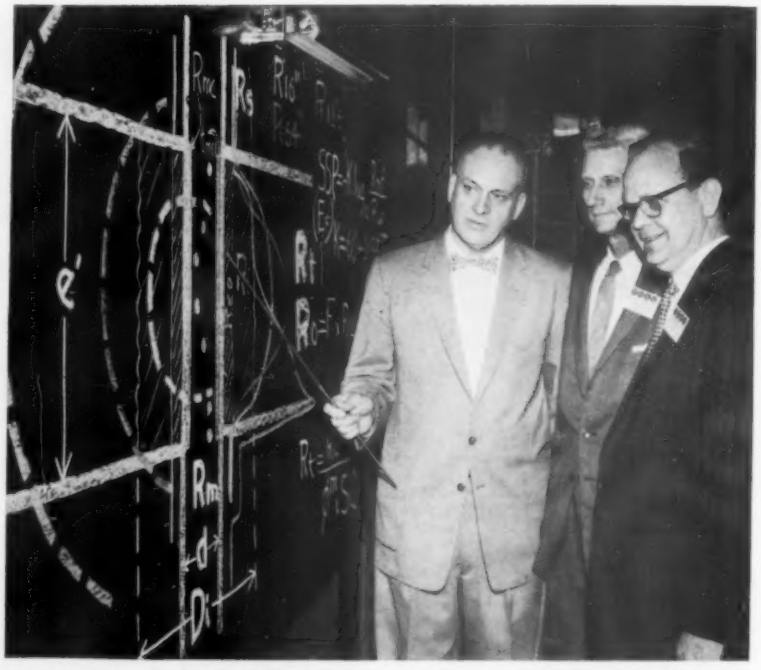
The field of well log interpretation is becoming so complex that "outside" schools are getting increased emphasis as a means of keeping technicians and management up-to-date on rapidly changing developments.

Such schools, usually of the short-course variety, are conducted by a relatively small number of highly qualified consultants, and are distinct from the classes conducted by service companies.

The subject matter ranges from basic to advanced, and the sessions are held abroad, as well as domestically.

Sometimes the classes are composed of personnel from an individual operating company, and at other times, of mixed groups from several companies or independent firms.

The trend has been discernible for a dozen years, but the large array of logging tools and techniques available today plus the necessity of more accurate log interpretation and analysis apparently is enhancing the popularity of the approach.



THEORETICAL DIAGRAM is used by R. G. Hamilton, Hamilton Well Log Consultants, Tulsa, to illustrate conditions surrounding borehole, and geometrical factors.

Some of the schools are getting under way now, with a half dozen others planned for the rest of the year.

Sylvan J. Pirson, University of Texas, and Jack Grynberg, Denver, this week began a two-week, eight-hour-a-day session in Austin. This is the 17th such log interpretation course arranged by Pirson.

These courses have been held in the past in Calgary, London, Paris, and Milan, as well as in the U.S.

Pirson has scheduled another school for Calgary in June, and a third in London for the end of July.

Pirson also will conduct a four-week reservoir engineering school in London following the lugging session.

On Feb. 1, a new firm—Elmdahl, Leone, Lipson & Associates—was formed in Houston to teach formation evaluation, primarily in foreign countries.

These classes will be somewhat different: In addition to well logging, they will cover mud logging, drill-stem testing, wireline formation testing, and core analysis.

The sessions will be aimed primarily at training nationals who are operating company employees in various countries—Venezuela, Colombia, Libya, Argentina, and Trinidad. The Venezuelan session is slated for this summer.

One of the partners, Leonard B. Lipson, has been conducting logging schools sponsored by major oil companies for several years.

R. G. Hamilton, Hamilton Well Log Consultants, Tulsa, will conduct several logging schools this year, including two this summer at his lodge on Oklahoma's Tenkiller Lake. He also plans a six-day advanced school in Denver in March, and a two-week advanced school in Tulsa in November.

WELL LOG INTERPRETATION SCHOOLS, such as this one run by Pirson Grynberg Associates, are being held with regularity throughout the U.S., Canada, and overseas.

Most of the schools essentially follow the same established procedures.

Each school, of course, has some individual educational material, but much of the material is more or less common to all.

Hamilton's first week, for instance, is restricted to elementary studies of logging devices and their applications, much the same ground covered in schools conducted by service companies.

The advanced school, which occupies the final four days, concentrates on the quantitative methods and evaluation of accuracy of results of interpretations. Also stressed are reserve

appraisal methods and oil-finding techniques.

This year, for the first time, one of the schools will be offered to personnel of various federal agencies, where a fundamental knowledge of well logging is a desirable asset.

This school will be conducted May 15-26 by Hamilton for personnel of the U.S. Geological Survey, Bureau of Mines, and the Federal Power Commission.

Representatives of several eastern State Geological Surveys and gas companies may also attend.

Another "first" this year will be a two-day seminar for management and supervisory personnel only, dealing primarily with economic aspects of well logging.

Technical details will be kept to a minimum as discussions range through the pros and cons of prevalent log types, training of logging personnel, selection of optimum logging programs, and value of selected log combinations for exploration purposes.

Perhaps the most interesting new development this year is a planned "Logging University on Wheels."

Hamilton plans to conduct introductory and advanced log interpretation short courses in various major oil centers on a rotating basis over the next several years.

To expedite this plan, the Tulsa consultant has assembled what he refers to as his "Logging University on Wheels." Carried via station wagon, the equipment consists of a projector, blackboard, more than 250 illustrative slides, and a 300-page laboratory manual distributed to all participants in the school.

Observes Hamilton: "Printed matter disseminated at the schools is constantly revised to encompass as comprehensively as possible the ever-expanding field of well log analysis."

Distributed also are several dozen selected technical articles by outstanding authorities, the patented Arps-Hamilton Loganalyzer, and plastic scales and charts required for specific analytical techniques.

In his teaching, Hamilton stresses the "learning by doing" concept. Specially designed problems are so arranged that each new problem repeats previous operations, thus employing the principles of repetition and practice.

Rotating schools are broken down into two basic divisions: a six-day school covering elementary and advanced phases of interpretation, and a ten-day school for those specializing in advanced work.

The six-day school involves 42 hours of classroom instruction and practice, plus assigned reading. The ten-day school requires 70 hours of instruction plus outside reading and problems.

Included in the six-day school are up-to-date studies of principal well logs in current use; various interpretative techniques including both Archie and Ratio methods; procedures, data processing; miscellaneous special application logs; directional surveys; and laboratory problems with all types of logs.

Additional topics covered in the ten-day school incorporate special problems in log interpretation such as quality control in carbonates and fractured reservoirs, latest interpretative methods for detecting oil and gas, and the use of computers in log interpretation.

Of the advanced courses, Hamilton says: "Nothing is taken for granted. Equations accepted per se in elementary courses are torn apart and their derivations determined. Students are encouraged to devise new approaches to fundamental problems."

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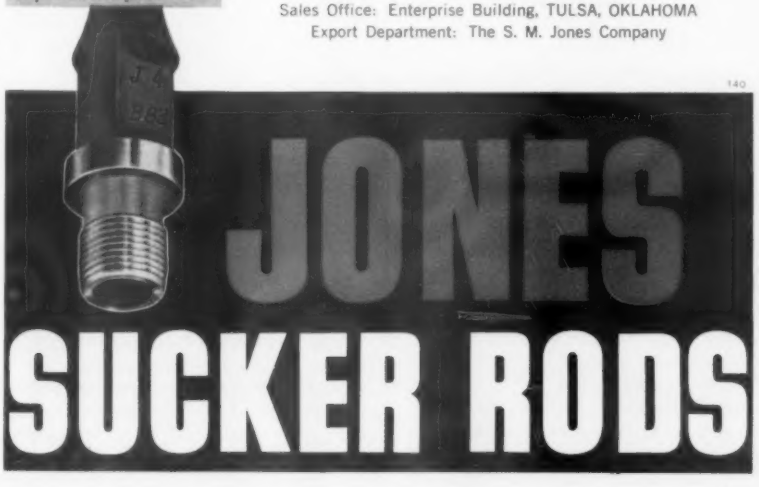

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What's New / IN PRODUCTION

Delhi-Taylor Sells San Juan Basin Gas Wells

Delhi-Taylor Oil Corp., Dallas, has sold 23 Dakota sand gas wells in the San Juan Basin, Northwest New Mexico, to El Paso Natural Gas Co.

Under terms of the sale, El Paso agreed to repay Delhi its cost—approximately $2.7-million—of drilling, completing, and equipping the wells. Also, El Paso has agreed to develop fully the Dakota formation under Delhi leases, within five years. This could mean, depending upon the New Mexico Oil Conservation Commission's spacing ruling, the drilling of from 150 to 300 Dakota holes. El Paso assumed a minimum obligation of 45 holes per year for the next two years.

•

A Texas operator, La Brea Corp., Dallas, will carry out a thermal recovery project in the McKittrick (Calif.) field, Kern County. The company plans to drill five core holes near the community of McKittrick, on a farmout from Standard Oil Co. of California. Target of the core holes, and apparent target for the fire flood, is the Amnicola sand of Pleistocene age, which contains 12-gravity oil at depths near 1,000 ft.

•

Home Oil Co. is planning a multi-million-dollar expansion of its Carstairs field gas plant, 30 miles north of Calgary, Alberta.

Under the expansion plans, raw gas from the Crossfield and Carstairs fields will be processed at rates up to 228-million cu. ft. per day. The plant, which went on stream in late February, 1960, has been producing approximately 66-million cu. ft. per day of gas, and 2,500 b/d of condensate. After the improvement, these rates will be upped to 200-million cu. ft. per day of residue gas, and 7,500 b/d of condensate.

•

The first oil sextuple completion in Texas has been approved by the Texas Railroad Commission.

The multiple is Humble Oil & Refining Co.'s No. 167 King Ranch-Borregos, Borregos pool, Kleberg County, Southwest Texas.

The commission at the same time approved another sextuple that will produce gas from five zones and oil from one. It is Sunray Mid-Continent Oil Co.'s No. 20-E McFaddin, McFaddin field, Victoria County (see page 23).

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The U.S. Interior Dept. is surveying the Woodside (Utah) helium reserve with a view toward possible development.

U.S. Senator Wallace F. Bennett (R., Utah) said last week he had received a letter from the department notifying him that it is seeking to determine the extent to which the resources can be put to use.

Oil and gas companies have on several occasions petitioned the department in the past to drill on the Woodside dome, in Emery County, for possible oil and gas accumulations below the helium section in the Coconino formation at 2,200 ft.

•

Humble Oil & Refining Co.'s exploratory efforts in Oregon have been set back by a dry hole for the second time.

Humble No. 1 D. J. Leavitt et al, section 2-40s-20e, Lake County, in the Goose Lake area, 9 mi. north of the California line, was abandoned at 9,579 ft.

The dry hole is 25 mi. southeast of Humble's first Oregon wildcat, which was abandoned some months ago at 12,093 ft., the second deepest hole drilled in the state.

•

Additional recovery of 14.9-million bbl. of oil is expected by three operators from a cooperative waterflood program planned for Slaughter pool, Cochran County, Tex.

The properties involved in the program are Honolulu Oil Corp.'s Igoe-Smith lease, Pan American Petroleum Co.'s J. Sanford Smith "A" lease, and Great Western Drilling Co.'s H. T. Boyd lease.

The leases cover 2,584 of the 85,200 acres in the pool's San Andres reservoir.

•

The Texas Railroad Commission's use of its "participation factor" for-

mula to shut down six gas wells in Leon County has been upheld by the state's Third Court of Civil Appeals.

The court reversed an Austin District judge who had declared invalid the proration order for Buffalo and South Buffalo gas fields, and also the shut-down order against M. B. Rudman and others in the Leon County lease.

The Rudman group had overproduced gas during the last five months of 1959, the commission found. The wells were ordered shut in until the excess has been offset by under-production. The commission also had found the Rudman group wells were producing ten times the "fair share" allowed under the formula for the area involved.

•

Zapata Off-Shore Co. has acquired a "substantial interest" in National Tube Coating Co., Beaumont, Tex. National processes plastic-coated tubular goods used in drilling and completing wells. Zapata, a marine drilling contractor, has not disclosed the amount of interest it acquired in the transaction.

•

The Wyoming state legislature has passed a bill that requires the state's Mineral Supervisor be either a registered professional petroleum engineer or geologist.

The superseded law stated that he had to be a qualified petroleum engineer, but did not stipulate that he be a "registered professional."

•

Engineering

Reliance Electric & Engineering Co. has developed an oil well pump motor that will operate on either 220, 440, or 762 volts.

This flexibility will permit selection of operating voltage at the time the motor is installed, the Cleveland (Ohio) company says, and permit the user to rely on only one type of motor to meet conditions in moving from pool to pool.

•

A round-trip, ton-mile calculator for drilling contractors and engineers is being offered by Macwhyte Wire Rope Co.

The calculator, 4¾ in. x 10½ in., can be used for quick computation of ton miles for depths to 30,000 ft., using drillpipe up to 6⅝ in. in diameter. The calculator can be obtained without cost from the Kenosha (Wis.) company.

•

Drilling Highlights

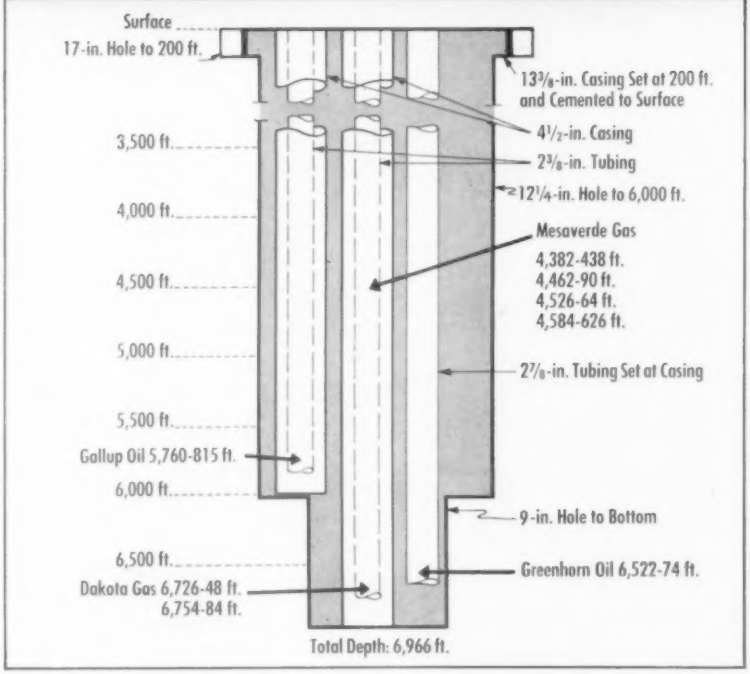
West Texas—Tom Brown Drilling Co. and Healy & LeBlond No. 1 J. B. Young, section 6, block 50, township 8, T&P survey, Reeves County, was completed as a Delaware sand discovery, flowing 169 b/d of 39-gravity oil through 20./64-in. choke and perforations at 5,161-70 ft. The well is 10 mi. southwest of production in the Worsham field.

In Terrell County, Mobil Oil Co. No. 1 Banner-State, section 332, TW&NG survey, 2 mi. southeast of Brown-Bassett gas field, flowed 165-million cf/d of gas on open flow through perforations at 13,370-423 ft. and open-hole section at 14,423-529 ft. in the Ellenburger (Ordovician). Work now is under way toward dually completing the well in the Strawn between 11,204-642 ft.

And in Scurry County, D. M. Cogdell No. 1 H.&W. Winston, section 183, block 3, H&GN survey, was completed for 201 b/d of 45-gravity oil through 16/64-in. choke and open hole at 6,9640-60 ft. in the Canyon reef (Pennsylvanian). The opener is 1½ mi. east of Southeast Kelly Synder pool.

Kansas—Time Petroleum Co. No. 1 Crandell, section 10-4s-27w, Decatur County, recovered 180 ft. of 40-gravity oil, 535 ft. of gas, and 185 ft. of very heavily oil- and gas-cut mud on 1-hour drillstem test of the Lansing at 3,588-612 ft. The prospect is 3 mi. northwest of Jennings field.

Continental Oil Co.'s Big-Hole Quadruple Completion



New Mexico Quadruple Is King Size

This schematic shows the proposed unconventional quadruple completion Continental Oil Co. plans for its No. 1-9 Northeast Haynes-Apache, Rio Arriba County, N. M. (PW—Jan.20'61,p17).

In most triple and quadruple completions efforts are made to keep hole sizes to a minimum in order to effect the drilling and completion economies of multiples (see page 23). The Conoco hole, however was made large enough to take the two strings of 4½-in. casing and 2⅞-in. tubing set as casing.

Also unlike conventional multiples, no packers will be used in the Conoco well, and all three strings will be cemented.

While the New Mexico Oil Conservation Commission has approved Conoco's application for the quadruple, the first in the state, the company is not expected to complete the well until some time in spring.

Nonwoven Fabrics: Tricky but Promising

An increasing quantity of products of petrochemical origin is being used in an unusual application: the manufacture of nonwoven fabrics.

Nonwoven fabrics are not new; the first fabrics used by mankind—tanbark or tapa cloth—were nonwoven.

Today nonwoven fabrics are used to make a wide range of products, from disposable tissues to draperies and upholstery materials. Some have even gone into working clothes and other wearing apparel.

What is generally referred to today as nonwoven fabrics consists of fabrics made of fibers held together by a chemical bonding agent or by mechanical means.

The fibers may be anything from cotton or wool to synthetics such as nylon, rayon, acetates, acrylics, or polyesters. The bonding agent can be a synthetic rubber latex, or a thermoplastic or thermosetting resin.

Most manufacturers of nonwoven fabrics have used basically the same method—but with variations.

The basic method consists of impregnating fibers with a bonding agent, and then compressing the mixture to form a strong, even material, having a good "snap"—that is, coming back readily to its original shape after having been distorted.

PREPLASTICIZED ACETATE WEB is "needled" at Celanese Fibers Co. laboratory.

The bonding agent can be applied as a spray, or the fibers may be dipped into it, or it can be "spot-printed" onto the fabric or dusted over the fibers. Processes depending on mechanical bonding may use "needling" or thermoforming.

Many companies, in the past few years, have entered the field of nonwoven fabrics, sometimes as a sideline to more conventional operations.

There are perhaps a score of companies that are in the non-woven-fabric field today. Among them, Chicopee Mills, Inc., division of Johnson & Johnson, makers of disposable sanitary products, Kimberley-Stevens Corp., Avondale Mills, Inc., Kendall Mills, Minnesota Mining & Manufacturing Co., Wellington Sears Corp., and Pellon Corp. are particularly active.

Celanese Fibers Co. has been experimenting extensively with nonwoven fabric techniques for the past five years. "We have done considerable development work," says Jack Osmar, of the Celanese Industrial Product Development division. "As a service to the industry, we have installed a great variety of nonwoven equipment in our laboratories, carried out tests, and given demonstrations."

A plant for making "Dorron," a new type of nonwoven fabric, has recently started production in Rhode Island.

Morgenstern Fabrics Development Corp. has started at Woonsocket, R.I., a plant that makes nonwoven fabrics by a new patented process. It claims that the fabrics produced have the appearance and the "hand" of natural textiles or woolens, but with several advantages.

In the Dorron process, the fibers are held to an intermediate layer of bonding agent by "needling" on both sides.

As there is no impregnation of the fibers, Morgenstern claims that the

Paper Machine Makes Nonwoven Fabrics

Nonwoven fabrics of synthetic fibers can now be manufactured on conventional paper-making machines, by a new process developed by Du Pont.

These fabrics, made out of Nylon, Orlon, or Dacron, have unusual physical properties, Du Pont says: Their folding endurance, tear strength, electrical and chemical resistance, and dimensional stability are many times those of cellulosic papers, and they are washable.

The initial commercial use for these paper-type synthetic fabrics today is for interliners of wearing apparel: Because of their great strength, they can be made much lighter than conventional linings. Thus, they offer the advantages of a synthetic material at less cost than a natural woven fabric.

Other potential uses such as electrical insulation and higher temperature filters are being investigated.

This process is made possible by the discovery of "fibrids"—polymers similar in chemical composition to the fibers used in the fabric, but possessing mechanical bonding properties, when fused, similar to those of wood pulp.

When a small proportion of these fibrids—about 25%—is added to the regular, short-length synthetic fibers, the mixture can be processed on conventional paper-making machinery. The final product Du Pont calls Textryl.

Du Pont has not revealed the details of its patented process for making the fibrids.

new fabrics have several advantages:

- Great lightness for equal thickness.
- High strength, due to the continuity of the central bonding layer, and no tendency to "delaminate."
- Softness and pliability; absence of stickiness or boardiness.
- Permeability to air, making the Dorron fabrics adaptable to clothing and to many industrial uses.
- Possibility of using any type of fiber or bonding agent, to obtain a great variety of finishes, and to use the fabric as carrier for a variety of industrial fillers, such as abrasives.

And the cost, Morgenstern says, is but a fraction of a comparable woven fabric having the same appearance.

The reason for making nonwoven fabrics was initially one of economy: Waste fibers that are not usable otherwise can be recovered and utilized to good advantage in making low-value products of nonwoven fabrics.

However, the cost of the fabric is a relatively minor item in the cost of a finished textile product.

Union Carbide Corp., in a recent survey of the nonwoven-fabric market, came to the conclusion that the cost of the fabric accounts for only 15% of the cost of a woman's smock; about 30% of the cost of a man's shirt. Therefore the logic of making nonwoven fabrics may be questioned, UCC says, unless some other advantages can be shown besides cost.

Nonwoven fabrics have also shown certain definite advantages over conventional woven materials.

E. I. du Pont de Nemours & Co. told PETROLEUM WEEK that a very thin, but very resistant, fabric of synthetic fibers, such as Dacron or Orlon, offers great advantages as a backing for insulating varnish in the electrical industry. But such a fabric, if woven, would be very costly. On the other hand, a very thin nonwoven fabric of synthetic fibers is inexpensive; it is particularly resistant to water.

Conversely, Du Pont says, great thickness can be achieved economically in nonwoven synthetic materials for cushioning and shock insulating uses.

Nonwoven fabrics also have disadvantages, when compared with conventional woven materials.

They often have a certain rigidity that manifests itself in two ways: a poor "hand"—referring to the feel of the material; and a tendency to develop internal delamination after repeated bendings or foldings.

Various attempts have been made to overcome the disadvantages inherent to the conventional methods of making nonwoven fabrics.

Morgenstern, for example, claims that its Dorron process will do away with most of the objections.

Du Pont has developed a binder-fiber for making nonwoven polyester fabrics: To the regular, oriented Dacron fibers, which have a melting point of 480F, it adds a small percentage of nonoriented polyester fibers, which melt at 400F. When the nonwoven web is heated to 400F, these binder-fibers melt and act as a bond.

Development in nonwoven-fabric technique has been slow because of the unbelievable degree of secrecy with which nonwoven fabric makers have, heretofore, surrounded their process.

"No one," manufacturers of fibers and latex complain, "can go through the door of a nonwoven fabric plant. How can a chemist develop a better bond," they ask, "if he is denied any information about the results obtained with his products, except a blunt statement that, 'it didn't work'?"

Structural Plastic Makes Debut

Another acetal polymer has been added to the list of plastics available for structural design: It is Celcon, manufactured by Celanese Corp. of America at its Clarkwood (Tex.) plant.

Only pilot-plant quantities are available at present. But by January, 1962, Celanese says, a multimillion-dollar plant now under construction at Bishop, Tex., will be ready for commercial production.

Celcon is a copolymer of trioxane —a formaldehyde derivative—and another product, which Celanese will not publicly identify.

Trioxane has been manufactured for several years at the Celanese Bishop plant. It is a cyclic trimer of formaldehyde, which melts at about 140F, boils at 235F. It is made from LPG —mostly propane—which Celanese transforms into formaldehyde by vapor-phase oxidation.

The new plastic has great strength and stability because of its carefully ordered molecular structure, Celanese says.

It can carry heavy loads at reasonably high temperatures; its softening point is 230F. It is very hard (picture). Its resistance to attack by a wide range of chemicals, including alkalis, is another of its advantages, according to Celanese.

Celcon is supplied in white, translucent, free-flowing pellets. It can be extruded and blow-molded in conventional equipment. Celanese does not contemplate making Celcon film.

Largest immediate use for Celcon, is expected to be as replacement for diecast metals, Celanese says.

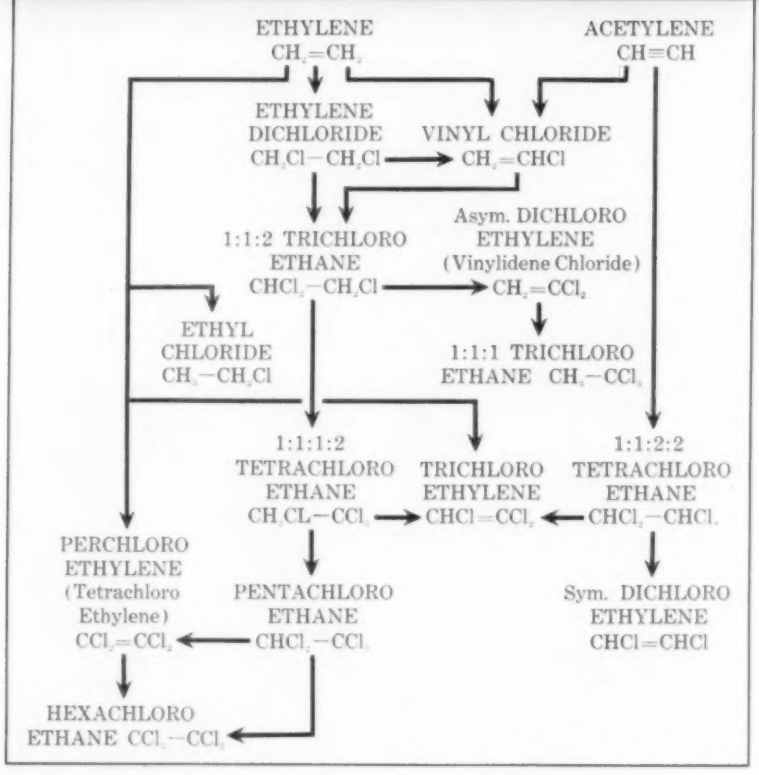
With a specific gravity of 1.41, Celcon is much lighter than even the lightest metals, and saves manufacturers the expense of costly finishing and assembly procedures.

A major market, Celanese believes, will be in decorative and functional parts for automobiles, where high strength and heat resistance are critical requirements.

PLASTIC NAILS made from new acetyl polymer are strong enough to be hammered through a wooden block at laboratory of Celanese Polymer Co.

The 22 lb. of plastics now used in current car models are expected to rise to 60 lbs. by 1970, according to Celanese.

How Chlorinated Hydrocarbons Are Made from Ethylene and Acetylene



Chlorinated Hydrocarbons Grow

Chlorinated hydrocarbons are due for a big expansion in the '60s. It is estimated that their production will reach 4.5-billion lb. by 1970, an increase of more than 40% over 1960.

R. K. Treichler, of Dow Chemical Co., Freeport, Tex., made that prediction at this week's meeting of the American Institute of Chemical Engineers, in New Orleans.

He reviewed the rapid growth of the chlorinated hydrocarbon industry since the turn of the century, when carbon tetrachloride—used as a cleaning agent and a fire extinguisher fluid—was first imported from Germany, then manufactured in the U.S.

Today these products all come from natural gas and refinery gases. Their development started in earnest when ethylene became commercially available around 1940.

In 1940, there were 18 plants making chlorinated hydrocarbons, in 13 cities. Of these, only one, in California, used natural gas as raw material. Today there are 44 plants in 31 cities making these products, and nearly all use gas to start with. They have a total capacity of nearly 4.5-billion lb.

This includes nearly 1¼-billion lb. of temporary overcapacity.

The three main raw materials for chlorinated hydrocarbons are methane, ethylene, and acetylene.

Some years ago, acetylene was the principal source, but its price today in the U.S. is so much higher, compared to methane and ethylene, that the latter two have largely replaced it.

The growth of chlorinated hydrocarbons is likely to be even greater, Treichler said, as soon as some really economic way is found to make acetylene from natural gas.

Vinyl chloride, with a 1960 production of about 1-billion lb., is the fastest growing of the chlorinated hydrocarbons.

It is made in about equal quantities from acetylene and from ethylene.

Actually, there are three modern methods for the manufacture of vinyl chloride, two from ethylene, and one with acetylene as a starting point.

This has made it possible, Treichler pointed out, to perform an interesting balancing act in recent installations. Thermal cracking facilities are being installed to dehydrochlorinate ethylene dichloride to vinyl chloride, and to recover a substantial amount of anhydrous hydrochloric acid. This anhydrous HCl can be used to make vinyl chloride via the acetylene route.

Applications of vinyl chloride to make structural and building materials are way behind the applications in England and Germany, Treichler said, but they are catching up rapidly.

Another chlorinated hydrocarbon, which comes almost entirely from ethylene today, is ethyl chloride.

It used to be made initially from ethyl alcohol. Actually, it is the only product, among the chlorinated hydrocarbons, which shows signs of a downtrend. Production reached a peak of 650-million lb. in 1956, but today annual output hovers around 500-million lb. a year.

Acetylene is still the main raw material for the making of trichloroethylene.

In view of the very low price of acetylene in certain European countries, a large proportion of trichloroethylene has been imported in recent years, particularly from Italy. It is used mostly as a metal degreasing agent.

Methane is the most difficult of paraffins to chlorinate.

At sufficiently high temperatures, however, the reaction proceeds normally. A large proportion of the carbon tetrachloride and chloroform manufactured today comes from methane.

Another chlorinated hydrocarbon that has a very good growth prospect comes from propylene: It is allyl chloride.

This is the raw material for one of Shell Chemical Co.'s methods of making glycerin.

And one of the steps between allyl chloride and glycerin, in this process, is chlorohydrin, an important component for the manufacture of epoxies.

A substantial use of chlorinated hydrocarbons derives from the fact that they are an intermediate step in the making of fluorocarbons.

Fluorocarbons, such as Teflon, Kel-F, and others, are highly resistant polymers which are just entering the stage of volume production. An economy in fluoride can be effected by starting with a chloroparaffin, then replacing the chlorine atoms with fluorine by using hydrogen fluoride.

Deasphaltening Improves Residual Feed

Substantial improvement in the hydrodesulfurization of residues, prior to further processing, can be achieved by first removing the asphaltenes from the residual feedstock.

Economic conditions frequently make it advisable to upgrade as much as possible of the residue from atmospheric and vacuum distillation.

This is generally difficult, because of the high carbon-to-hydrogen ratio of such a residue, and the high concentration of poisons and contaminants in it, which are detrimental to the cracking or reforming catalysts.

By cleaning up the residue with hydrogen and a catalyst, a feedstock can be obtained that is much more processable. But such hydrotreatment is a complicated process when the feedstock is a heavy asphaltic residue.

Gulf Research & Development Co. has found that removing the asphaltenes from the residue feedstock, prior to hydrodesulfurizing, makes the cleaning process significantly simpler.

Gulf engineers described the results of their studies at this week's meeting of the American Institute of Chemical Engineers, in New Orleans.

Conventional propane deasphalting is not satisfactory for the removal of asphaltenes.

Propane deasphalting, the Gulf engineers explained, removes more of the residue than is advisable: The objectionable asphaltenes constitute only about one-third of the asphalts, and only about 20% of the total residue.

To remove the asphaltenes selectively, in the laboratory, normal pentane is used.

The asphaltenes are insoluble in n-pentane and can thus be separated.

The soluble portion is a "maltene," from which the pentane can be recovered.

The liquid fraction of a pentane-deasphaltened residue is a very valuable constituent, which responds freely to hydrodesulfurization.

This maltene fraction consists of a resin and an oil; it increases significantly the yield of useful oil from the residue.

Further treatment of this maltene with propane would then complete the conventional deasphalting process. It would separate the semi-solid resin from the liquid oil.

But for deasphaltening, this need not be done.

The asphaltenes are not only low in hydrogen, they also contain most of the contaminants objectionable in further upgrading operations.

Gulf analyzed several types of residues, coming from different crudes, before and after the asphaltenes, resin, and oil fractions had been separated. It found that the asphaltenes were poor in hydrogen—7% to 8%—and high in sulfur, nitrogen, and vanadium; the vanadium concentration, in particular, was 60% to 80% of the vanadium concentration in the residue.

The removal of asphaltenes not only accelerates the desulfurization process, but makes it possible to obtain better products at lower operating pressures, according to Gulf engineers.

Because of the inhibiting effect that the asphaltenes exert upon the reaction rate, their effect is actually disproportionately large. Although they represent only 20% of the charge, the reaction rate can be doubled once they are removed.

At high pressures, the entire resi-

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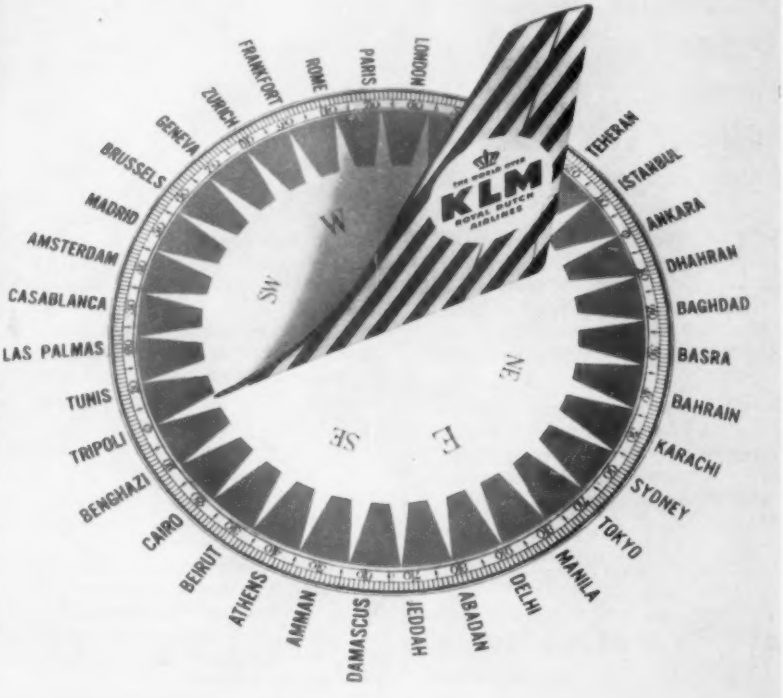

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due charge can be converted to a good quality of catalytic cracking stock after deasphaltening.

At a low pressure of 1,000 psi. in the HDS system, the amount of the charge converted to gasoline and furnace oil remains about the same, but the quality of the products is substantially improved when deasphaltened feedstock is used.

A commercial process for the removal of asphaltenes is expected to be available soon.

Gulf is currently developing such a process, a spokesman told PETROLEUM WEEK. It will be far more selective than conventional propane deasphalting, and Gulf believes that it will make deasphaltening an economical operation.

What's New / IN PROCESSING

A new thermal process for converting hydrocarbons into benzene and naphthalene is being developed by Atlantic Refining Co. and Hydrocarbon Research, Inc.

The HDA process will use high temperatures to bring about reaction, but no catalysts. Several other companies, including Sun Oil Co. and Sunray Mid-Continent Oil Co., are currently working on similar processes.

The advantages claimed for these thermal processes are lower investment costs, higher yields, and freedom from catalyst problems. On the other hand, a much closer control on the temperature is essential for these thermal processes to operate satisfactorily.

Two processes using catalysts to make benzene and naphthalene from refinery feedstocks are already in operation: the Hydeal process developed by Universal Oil Products Co., and Houdry Process Corp.'s Detol process (PW—Sep.30'60,p39; Feb.24'61,p36).

•

Plastic-clad steel plate that can be rolled and welded for fabrication offers a new, effective means of protection against corrosion of equipment as well as contamination of products.

It was demonstrated for the first time this week at the New Orleans Petrochemical Show of the American Institute of Chemical Engineers, by Lukens Steel Co., Coatesville, Pa.

•

A second smog compound causing eye irritation and plant damage has been isolated and synthesized by the Air Pollution Research laboratory at the University of California. The compound, PPN, peroxypropionyl nitrate, was produced from synthetic smog in the laboratory.

It is related to PAN, peroxyacetyl nitrate, the double-acting smog component that was isolated last year. (PW—May27'60,p40).

Scientists at the university feel PPN and PAN are responsible for pollutant damage to manufacturing facilities and crops when smog-recording devices fail to show high oxidant readings indicating presence of damaging elements. The minute concentration of the compounds that will do damage cannot be recorded by oxidant-recording machines.

•

National Distillers & Chemical Corp., will build a 60-million-lb.-per-year linear polyethylene plant in the Houston ship channel area.

The cost of the plant is expected to be about $15-million; it will be completed by the end of 1962.

•

United Carbon Co. has selected a site near Los Angeles for a new carbon black plant.

The plant is expected to be in operation by late 1961. Lummus & Co. is the contractor.

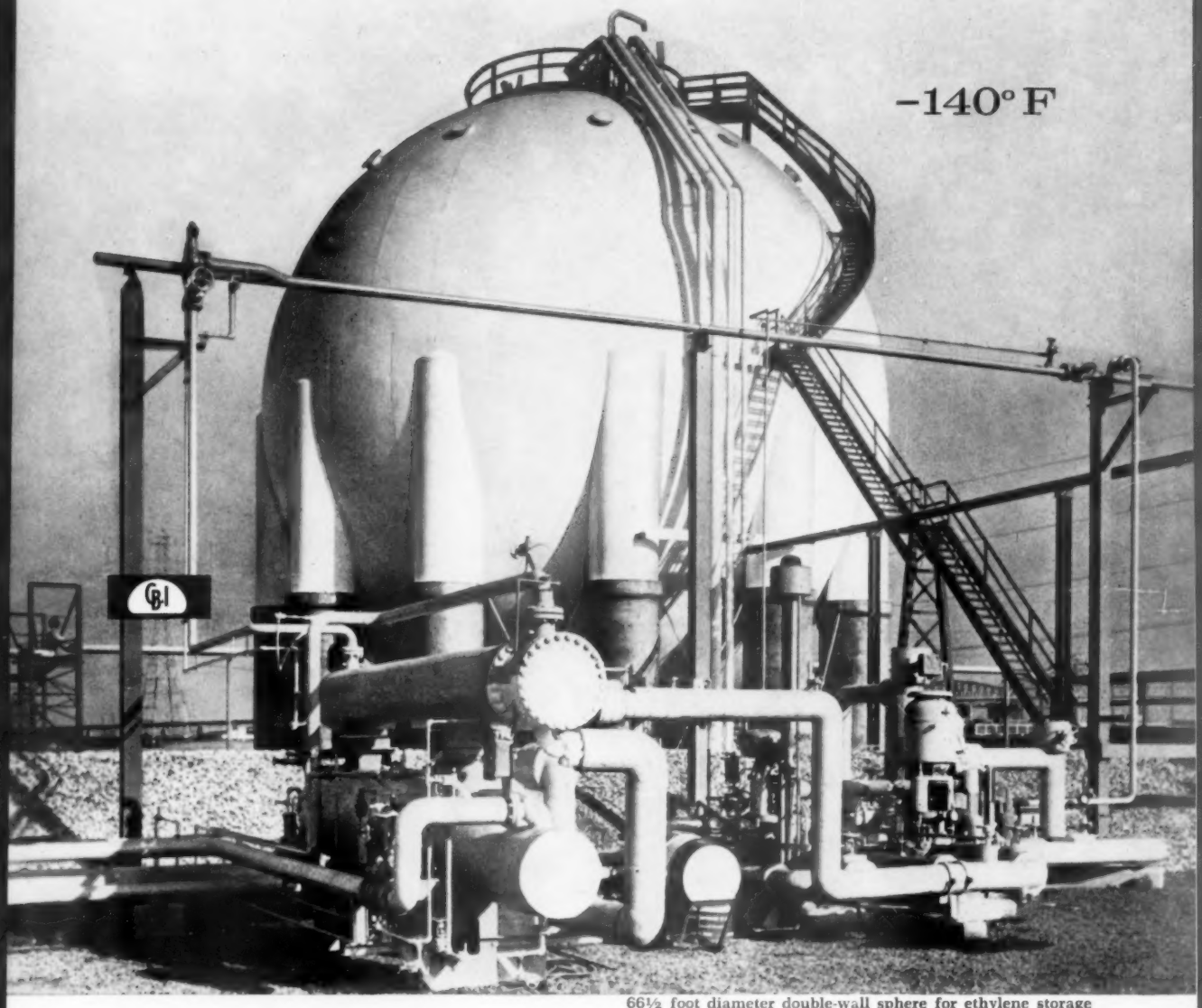
United Carbon produces more than 1-million lb. of carbon black per day in the U. S., and manufactures and sells synthetic rubber masterbatches.

•

A new plant for manufacturing lubricating oil additives has been put on stream in Mexico by the Oronite Division of California Chemical Co. The plant, known as Quimica Oronite, S. A., is located near Mexico City. Its initial capacity is 1-million gal. of blended additives a year.

The facility includes nine storage tanks, a boiler plant, transformer station, office building, and chemical laboratory.

NOTABLE FIRSTS



66½ foot diameter double-wall sphere for ethylene storage

FOR LIQUID ETHYLENE

The 20,000 bbl. sphere in which liquid ethylene is stored at −140°F at the Bayway Refinery of Esso Standard, Division of Humble Oil & Refining Company, Linden, New Jersey, has the distinction of being the largest double-wall sphere as well as the largest above-ground storage unit for ethylene in the U.S.

CB&I's extensive experience in cryogenic storage was called upon, through Stone & Webster Engineering Corporation, to design, fabricate and erect the sphere. This is another example of how CB&I readily provides the most suitable cryogenic storage unit when new liquid gas storage requirements arise.

CB&I has built more than 75% of all of the field-erected cryogenic storage vessels in the world. May we tell you how this experience can provide the most advantageous liquid gas storage for you?

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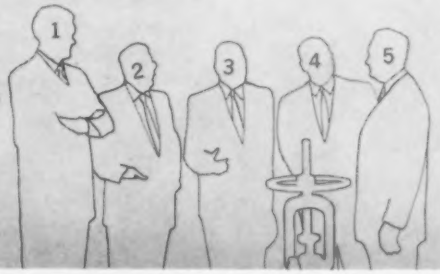

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Amoseas Wants to Sell Turkish Field

ANKARA—For sale: one Turkish oil field, the first found by an American company. Contact American Overseas Petroleum Ltd.

Such an advertisement might well be running these days. For Amoseas, an affiliate of Caltex, is looking for buyers for the production rights to its Kahta field, the first discovered by a foreign company after exploration by foreign firms started in Turkey six years ago.

The oil field for sale has three wells, each capable of producing 700 b/d. But there is a catch: The oil is very heavy—11.2-gravity, to be exact.

Amoseas has been producing the highly asphaltic crude from the field and selling it directly to the Turkish highway department.

The Kahta discovery, in southeastern Turkey, was made in mid-1958. In all, Amoseas drilled five tests on the structure, two of which were dry.

Development work has not been completed in the field, and it is possible other producing wells could be drilled.

Amoseas' exploration activities in Turkey have been slow for the past year. In 1960, the company drilled one wildcat.

Meanwhile, Mobil's luck in Turkey is holding up. The company has just completed a new 640 b/d producer of 37-gravity oil in its Bulgurdag field.

The new well, the No. 5 Bulgurdag, is located ½ mi. east of the discovery well completed last summer for 1,200 b/d (PW—Jul.29'60,p40).

Of the five holes Mobil has drilled on the Bulgurdag structure, three have been completed as producers. Test rates have ranged from 640 b/d to 1,200 b/d.

Bulgurdag is considered to be of commercial importance, particularly because of its nearness—40 mi.—to a 65,000 b/d refinery now being built by Mobil, Shell, and British Petroleum at Mersin.

Mobil is also pressing its exploratory drilling on two additional structures in the Bulgurdag area.

It was reported last week that drillers were rigging up on the No. 1 Ceyhan site, 25-mi. east-southeast of the Bulgurdag discovery, and on the No. 1 Dutsuyu site, 7 mi. west-southwest of Bulgurdag.

World Oil Industry Seen 'Adjusting'

The international oil industry may be on the way to a "healthy adjustment" of its problems—despite another upturn coming in spare productive capacity, according to a Standard Oil Co. (N. J.) production executive.

The view that 1960 marked the beginning of a trend in the right direction was expressed this week by Zeb Mayhew, Deputy Coordinator of Producing Activities of the international major.

For one thing, he said, the industry is learning to appreciate—and, "more important, to live with"—growing nationalism and the compelling desire of nations to become self-sufficient in oil.

World overcapacity will undoubtedly continue for many years, Mayhew told the annual Society of Petroleum Engineers, American Institute of Mining, Metallurgical & Petroleum Engineers meeting in St. Louis.

In fact, Mayhew said, major investments currently being made abroad can only result in "another upward cycle."

More than 300 oil companies spent $5-billion in some 100 foreign countries on producing operations alone last year, Mayhew said, without detailing this estimate.

Nonetheless, in free foreign areas, spare productive capacity increased only slightly in volume during the year and leveled off as a percent of total capacity, he noted.

Over the past decade, spare capacity in free foreign areas stayed close to 20% of total capacity, aside from a dip in 1953-57. With the U.S. included, however, the Free World total jumped to 27% from 18% in 1950.

Studies indicate, Mayhew said, that 10-15% spare is "adequate" for operating contingencies and growth, 20% "sufficient" to take care of most emergencies, and anything over that "probably" a burden even if prices aren't adversely affected.

Flexibility of supply "unmatched" in the industry's history is one bright spot in the picture, in Mayhew's view. And dependence on any given area is constantly being lessened by efforts to diversify sources of supply.

Mayhew sees this as "definitely as part of an adjustment" in that substantial amounts of additional oil com-

ing on the market will be from new areas—and at competitive costs.

Adjustment to adverse factors was being made last year with below-record levels of exploration and drilling activity in most areas of the world, Mayhew said. After long and rapid growth, capital expenditures in producing held steady, he noted.

And refinery runs were scheduled so that crude and product inventories are becoming "more reasonable."

World-wide oil reserves grew—although at a more moderate rate in 1960 than in recent years—to more than 300-billion bbl., Mayhew reported.

The Middle East, with 183-billion bbl., accounts for the greatest share, followed by North America with 41-billion, the Soviet bloc with 33-billion, South America with 23-billion, and the Far East with 11-billion bbl. Africa and Europe, though growing fast, still account for only 10-billion bbl.

Total world consumption grew 6.6% in 1960 to 21.8-million b/d, an increase of 1.3-million b/d over 1959.

Rapid growth in consumption continued in Europe, increasing 12.5%, in the Far East 11%, and the Soviet Union 10.4%, according to Mayhew.

Crude production was up in all oil areas, increasing 6.2% to a total of nearly 20.8-million b/d. The Soviet Union displaced Venezuela as the world's No. 2 producer with output of 2,960,000 b/d, Mayhew noted.

And in 1960, for the first time, three Middle East countries—Saudi Arabia, Iran, and Kuwait—all averaged more than 1-million b/d, a level also reached by Iraq at year's end.

Though North America is still the world's biggest producing area, Mayhew commented, it looks as if the Middle East will soon catch up.

The Jersey Standard executive noted that exports of Russian crude increased 23% in 1960 to 400,000 b/d, with stepped-up penetration of Free World markets.

"This oil," Mayhew said, "has an extremely disruptive effect on world markets, and it may take a concerted effort of Free World producers to find an effective way to combat it."

Mayhew noted that the Russians—willing to make barter deals—have penetrated many markets in Europe, South America, and the Far East.

Phillips Resumes Central America Hunt

Phillips Petroleum is ready to drill an offshore wildcat in British Honduras in a fresh effort to find Central America's first commercial oil.

The search so far has been discouraging, though oil shows were encountered in several countries in a spurt of wildcatting in 1956-58 by U.S. independents and majors. Their oil rights virtually blanket the area from British Honduras and adjoining Guatemala to Panama.

Exploratory drilling in the region had petered out in the past two years —due in part to the world's surplus producing and imposition of U.S. import restrictions, as well as disappointing results.

Only one country—Guatemala—has had a continuous drilling program during this period. And that has been maintained by only one three-company groups—headed by Ohio Oil, which is currently preparing for its third wildcat—though the list of U.S. firms with exploration interests there is longer than for any country outside the U.S. and Canada.

The new Phillips wildcat will be the company's third in British Honduras, where it drilled two dry holes onshore in 1959 in its first Central American exploration venture.

The offshore test will be spudded within the next week, 3 mi. off the southern coast of the British colony at a site 6.8 south of Placentia.

Offshore Co., Baton Rouge, is the drilling contractor. It will use a mobile, self-elevating, three-legged platform and tender now on location.

Phillips holds 2-million net acres of oil rights in the southern half of the country, including extensive offshore tracts, which it acquired in late 1958 from Los Angeles independents. Its initial wildcat was carried to 10,750 ft. at Punta Gorda and its second to 7,872 ft. at Machaco Creek a few miles northwest. Each had a minor oil show.

Gulf Oil, formerly an active wildcatter in the northern half of British Honduras, has done no drilling since 1958 and has no plans to resume this year.

The company drilled nine dry holes in 1956-58 before expiration of prospecting licenses in which Shell held a 50% working interest. It still holds some northern acreage with Shell, plus long-term leases in the south that include two offshore tracts surrounded by Phillips Petroleum holdings.

Sinclair & BP Explorations Inc. has pulled out of the country entirely after only preliminary geological work.

It has now formally withdrawn applications for acreage in the north that were submitted in 1959 shortly after it was formed by Sinclair and British Petroleum.

Standard of California, which also applied for northern acreage in 1959, so far has done only surface work.

Italian Independents, Too, Will Take Crude From Soviets

(A report from PETROLEUM WEEK'S *Moscow Bureau)*

MOSCOW—Independent Italian refiners will—like the Italian state-owned ENI group—take substantial volumes of Russian crude in 1961 under a just-signed trade agreement.

ENI entered into a four-year agreement with Russia last fall to take 12-million tons of low-cost Russian crude. It is to pay for the oil with large diameter pipe and synthetic rubber.

Because of the low cost of the Russian crude, ENI was able to make reductions in product prices. Thus, independent refiners in Italy were pushed to follow ENI's example and turn to Russia.

Under the new trade agreement, Italy will import 4-million tons of Russian crude in 1961—1.3-million for private firms and the remainder for ENI.

The Moscow announcement did not make clear whether the share for private refiners was originally included in the tentative agreement signed by ENI last fall or represents an additional supply.

The 4-million-ton figure represents about 14% of Italy's crude needs for this year, according to the Moscow announcement.

The agreement also calls for a 7.7% increase in the amount of Soviet fuel oil exports to Italy.

Italy will take a total of 700,000 tons of fuel oil in 1961, according to

the agreement, compared to 650,000 tons last year.

In return, Russia will get pipe and industry equipment and possibly a 48,000-ton tanker from Italy.

However, agreement on the tanker has not yet been reached.

A partial listing of the items to be imported by Russia includes machinery, electric power equipment, and chemical plants.

The new pact will provide for a 20% to 50% increase in trade between the two countries.

Last year, trade totaled $100-million. Under the new agreement the figure will rise to from $120-million to $150-million.

The two countries also have agreed on a draft for a four year trade pact covering 1962-65. But final signing is not expected until Mar. 10 in Rome.

Japan Near Policy On Own Mideast Oil

TOKYO—The Japanese government is nearing a long-deferred policy decision on the import status of Japanese-owned Middle East crude.

According to indications given last week by a spokesman for the Ministry of International Trade & Industry, the decision may wind up as a compromise between opposing views on preferential treatment for the oil.

All Japanese refining affiliates of foreign oil companies have now agreed to take a share of the crude, though some had held out for months against partial displacement of their own supplies under the proposal to prorate the crude among all refiners in Japan.

The government, however, still does not want to give the crude an additional preferential position as "yen oil." The Ministry, the spokesman said, wants to include Arabian Oil Co.'s Khafji crude within the present system—setting aside foreign exchange for it and prorating distribution among refiners in proportion to their share of the Japanese market. Arabian Oil, however, has not yet accepted this proposal, though it expects to bring in its first cargo in April from its offshore Neutral Zone field.

The price question is still up in the air. Tokyo would like the price set by "commercial" criteria in Japan's heavily discounted crude import market. This may be difficult, the MITI spokesman said. Arabian Oil has been insisting that refiners pay full posted price with no discounts.

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What's New / AROUND THE WORLD

Mobil May Drop Nigerian License

NIGERIA—Mobil may not renew its license to a 4,000 sq. mi. exploration tract when it expires next month, the company reported in New York this week.

The company said it had completed its drilling program—three tests—without success. The tract, the only one now held here by Mobil, is in western Nigeria near Lagos, the capital.

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ALGERIA—A site 19 mi. east of the CEP-Mobil Ohanet field in eastern Sahara has been chosen for a new wildcat by the French operator, CEP.

The rig was moved to the new site, No. 101 Tamadanet, from the No. 101 in Adaoui on which drilling was stopped at 9,411 ft. after strong gas shows between 7,880 and 7,946 ft. Mobil has a 25% stake in the venture, with the rest being held by CEP and other French firms.

•

VENEZUELA—Oil Minister Juan Perez Alfonzo again predicts a 4% to 6% increase in Venezuela's crude output. Chances of meeting it this year are better, he said last week, due to the cold winter and the 100,000 b/d increase in U.S. import quotas. Perez had predicted the same gain for 1960, but actual output increased only 3%.

•

BRAZIL—An economist will head the National Petroleum Council, Brazil's top oil-policy body. He is Josaphat Marinho, named by President Janio Quadros. He also confirmed his choice of geologist Geonisio Barroso as head of Petrobras, the state oil development monopoly, overriding military opposition to appointment of a civilian for that post.

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AUSTRALIA—Stanvac has awarded the contract for its projected 37,800 b/d refinery near Adelaide to M. W. Kellogg Co. The plant is slated to go on stream in January, 1963.

Stanvac at present has a 42,000 b/d refinery near Melbourne. When the current split-up of Stanvac's interests is completed by its parents, Socony Mobil will have a 74% interest in both refineries and Jersey Standard 26%.

•

FRANCE—Imports of Rumanian products will be reduced from 1960 by 10,000 tons this year, due to increasing French crude production in the Sahara. For 1961, France agreed to import 290,000 metric tons of Rumanian products plus $505,000 worth of oil industry equipment under a new three-year trade pact. Trade exchanges for the subsequent two years are not set.

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VENEZUELA—Creole Petroleum has appointed a fourth Venezuelan director to its nine-man board. He is Dr. Guillermo Rodriguez Eraso, formerly economics advisor to Creole's president.

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IRAQ—Crude production again topped 1-million b/d in January, though it was short of September's high of 1,043,266 b/d. The month's average was 1,029,898 b/d, up 130,204 b/d from January, 1959.

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SPAIN—An unidentified Communist country has proposed bartering oil for ten tankers to be built in Spain, highly placed sources disclosed in Madrid last week. The proposal, not confirmed officially by the Spanish government, comes at a time when Spain is seeking ways to overcome the effects of a recession.

•

SPAIN—American Overseas, a Caltex affiliate, has spudded its first Spanish wildcat, the No. 1 Zuazo, 28 mi. west of Vitoria in mountainous north-central Spain. The tract is held in a joint venture with the Spanish oil marketing monopoly, Campsa.

•

VENEZUELA—Crude output climbed nearly 200,000 b/d in January, topping 3-million b/d but short of a record 3,095,937 b/d in February, 1959. A 150,000 b/d boost by Creole accounted for most of the gain. The official government statistics (in 000 b/d):

Company*	Jan. '61	Dec. '60	Jan. '60
Creole	1,219.1	1,068.2	1,086.7
Shell	757.5	747.9	821.9
Mene Grande	411.7	411.6	441.2
Mobil	124.4	101.1	125.7
Sun	88.8	90.3	38.6
Richmond	79.5	75.6	45.0
Superior	72.4	52.7	39.3
Sinclair	64.2	60.0	34.9
Texaco	55.2	57.0	55.8
Phillips	47.0	47.3	59.3
San Jacinto	28.8	35.6	43.3
Atlantic	27.6	27.1	25.4
Signal	22.6	24.2	29.0
Mercedes	16.8	16.0	17.0
Caracas	8.1	7.9	6.8
Coro	7.4	7.5	7.7
Talon	1.1	1.2	1.1
Continental	0.6	1.8	—
Totals	3,032.8	2,833.0	2,878.7

*For joint ventures, total group production is listed under operator's name.

Caltex Plans Marketing Push in Italy

ITALY—Caltex is gearing to move into full-scale marketing in Italy on its own account for the first time.

Up to this point, Caltex has been represented only indirectly in Italy—through 50% holdings in two companies, both owned jointly with the Fiat interests.

One is Petrolcaltex, which markets products throughout Italy under that name. The other is Sarpom, a refining company with a 20,000 b/d plant in northern Italy, 20 mi. west of Milan.

Caltex reportedly has already completed arrangements to buy out full interest in its 50%-owned marketing and refining affiliates.

Though Caltex declined any comment on the report last week, the move is seen in Italy as aimed primarily at the marketing operation and only incidentally at expansion of refining interests.

Caltex, it is said, will retain a controlling interest in the refining company—but sell the rest to Esso, which may thus acquire a 40% share in Sarpom.

Esso has been considering a variety of plans to expand its Italian refining capacity (PW—Nov.25'60,p34).

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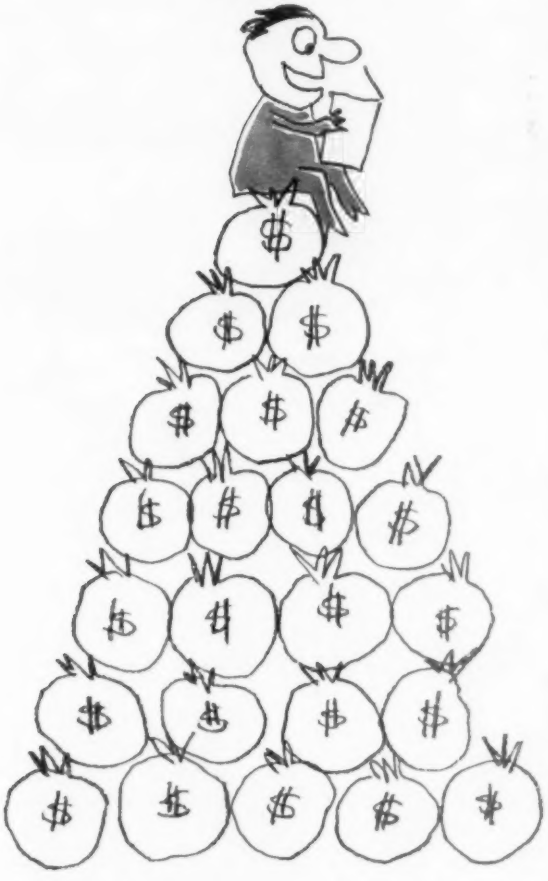

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REFRIGERATION TERMINAL under construction on Persian Gulf is one of two being readied there for tanker loading of LPG.

Tankers to Move More Middle East LPG

Tanker shipments of LPG will get a boost this year with completion of two terminals in the Middle East designed for loading refrigerated cargoes.

Facilities are now available in Saudi Arabia for exporting LPG under pressure by tanker.

Arabian American Oil Co. says it will be ready to offer refrigerated LPG to offtakers in August, and Kuwait Oil Co. hopes to begin shipment by October.

The Aramco terminal, which was originally slated for completion early this year, is being built at the company's loading port at Ras Tanura, in Saudi Arabia (PW—Jun.17'60,p66).

Kuwait Oil's bulk plant is under construction at Mina al Ahmadi, in Kuwait.

Kuwait Oil's installation will have a larger refrigeration capacity than will Aramco's terminal—6,000 b/d compared with 4,000 b/d.

Kuwait Oil's project will cost $9.8-million. Joint contractors are Kuwait Bechtel Corp. and George Wimpey & Co., Ltd.

Aramco's facilities will cost $7-million.

Storage capacity of Aramco's depot will be slightly bigger than that of Kuwait Oil—240,000 bbl. compared with 230,000 bbl.

Aramco has completed erection of two of three tanks of a capacity of 80,000 bbl. each. One will store refrigerated butane, and the other refrigerated propane. The third tank will be used for refrigerated propane and butane mixed in proportions specified in advance by offtakers. Kuwait is constructing two 65,000-bbl. tanks of spherical design, which will store butane and/or propane at 57.5 psig. or at —50F. A third tank of 100,000 bbl. capacity is being built to hold either propane or butane at atmospheric pressure at a temperature of —50F.

Kuwait Oil will be able to offer its LPG both chilled and under pressure or fully refrigerated at atmospheric pressure, so that tankers handling it in either state can be loaded.

A refrigerated tanker under construction in Japan will be used to transport the LPG.

British Petroleum Co., which jointly owns Kuwait Oil with Gulf Oil Corp., has a contract to supply LPG to Bridgestone Tire Co., Ltd., a Japanese-owned company.

Aramco will furnish its liquids to tankers in refrigerated form.

Kuwait Oil will get most of its LPG by compression and liquefaction of gas produced at its Burgan field, and then will move the condensate 17 mi. by pipeline to its Ahmadi refinery for fractionation prior to storing and loading.

Condensate from three gathering plants at the field will account for 77% of the 286,000 tons a year of feedstock going to the fractionating plant, with the remaining 23% coming from the existing refinery stabilizers.

At the field, the gas will be compressed successively to 50 psig., 185 psig., and 600 psig. After each stage of compression, the gas will be cooled from 210F to 130F by crude pumped from the gathering centers.

No liquids will condense in the first stage, but a recovery of 74 gal. per

minute is expected in the second and third stages.

The streams from the field and from the refinery will be mixed before reaching the fractionating plant.

The fractionating plant consists primarily of a de-ethanizer, de-propanizer, and de-butanizer.

Specifications for propane call for a product that is at least 95% propane, with not more than 3% ethane. The butane produced must be at least 95% iso- and normal-butane.

After removal of hydrogen sulfide and mercaptans, the clean liquids will flow under their own pressure to dehydrators, and then to the refrigeration plant and into storage.

Aramco will recover propane and butane from alkylation and polymerization plants at its Ras Tanura refinery.

Before being sent to the terminal area through separate pipeline systems, the propane and butane will be treated to remove sulfur and dried in a new plant at the refinery.

The liquids will be stored under pressure in two existing vessels in the terminal area prior to being moved by pipelines to the refrigeration and storage facilities under construction.

What's New / IN TRANSPORTATION

Montana-Dakota Utilities Co. plans to build a 106-mi. gas transmission line from Minot to Bismarck, N.D., at a cost of $4.6-million.

The 12-in. line will connect a pipeline, extending from near Baker, Mont., to Bismarck, with a line from the same Montana point to Minot.

Laterals will be constructed along the new line to serve communities en route.

A spokesman for Montana-Dakota says new contracts have been signed to purchase gas for the line in the Beaver Lodge-Tioga area.

•

Reynolds Metals Co. has awarded a contract to Todd Shipyards Corp. to build an aluminum barge, which is said to be the first ever constructed in the U.S.

Reynolds says it will lease the vessel to Industrial Marine Service, Inc., Memphis, for use in carrying "sensitive" liquid cargoes on the Mississippi and Ohio Rivers.

The barge will be able to haul 10% to 20% more cargo than would a steel barge of the same size at the same draft, according to Reynolds.

It will be 97.5-ft. long and 35 ft. wide, and will weigh over 173,000 lb.

•

Product distribution terminals have been opened by Shell Oil Co. in Madison, Wis.; Savannah, Ga.; and Montgomery, Ala., as part of a drive toward boosting efficiency in transportation, storage, and distribution.

Capacities of the terminals are: Madison, 4.2-million gal.; Savannah, 3.9-million gal.; and Montgomery, 735,000 gal.

The Madison and Montgomery depots receive products by pipeline, and the Savannah terminal by tanker.

•

The Federal Power Commission has been asked to disclaim jurisdiction over the Texas portion of the proposed Texas-Mexico-California natural gas pipeline.

Tennessee California Gas Transmission Co., which would build the line, argues that its use of the system would not involve interstate commerce.

If FPC disagrees, the company, a subsidiary of Tennessee Gas Transmission Co., has taken the alternative of seeking a certificate of public convenience and necessity.

Gas delivered through the line would come from both Texas and Mexico.

•

Standard Oil Co. (Ind.) feels confident that it can move natural gas liquids from Alberta to Chicago without its import quotas or those of its subsidiaries being affected.

The issue is important to Standard's proposal to build (with Pembina Pipe Line Co.) a pipeline between the two points (PW—Feb.17'61,p71).

Another factor on which the line is conditioned is the assurance that the quantity of production available for shipment through the system will not be limited by governmental action —through prorationing or otherwise— to less than 160,000 b/d.

Pipelaying Barge Starts 10,500-Mi. Trip

The L. E. Minor 350-ft. long pipelaying barge of Brown & Root, Inc., is towed out of Houston on the first leg of a 10,543-mi. voyage to Fao, Iraq, where the company will build dual underwater products lines from shore to a new supertanker loading dock. The barge—and a smaller sister barge, the M-209—will rendezvous at Key West, Fla., with a 4,000-hp. tug, the Elbe, which will tow both across the Atlantic, then through the Mediterranean and Suez Canal and up the Persian Gulf. The voyage, which will span nearly half way around the world, is expected to take 100 days. The Minor, manned by a captain and a crew of six, is carrying enough pipe for several days work, plus supplies and thousands of gallons of water for the men. The 200-ft. long M-209 has a cargo of two 110-ft. cargo-supply barges, together with anchors and pipeline-building equipment. Welders and other crewmen will be flown to the job in May, and after completing the Fao lines, will lay a line to Das Island.

The Tug-of-War in Oil Merchandising

One View:
In an age of supermarkets and new products, the service station must diversify or be plowed under by encroaching competitors.

The Opposing View:
The major oil company must restrict its service station products to automotive items. Diversification into specialties is wrong.

Major oil companies today are locked in a controversy over their merchandising strategy: There is pressure on them from many quarters to expand their line of service station products.

Most of the pressure is exerted by merchandising and advertising opinion outside the oil industry itself. But even within the major companies there are executives who would like to see diversification in the service station.

Another source of influence comes from manufacturers and marketers of products for the home and family. "They look at our thousands of service stations as a ready-made outlet for their products," remarks a TBA manager in a major oil company.

But even among major companies that are constantly reviewing their merchandising policies—to keep pace with their reorganization efforts—there is little expansion of service station products. One such company reveals that 95% of its service station line of merchandise consists of products sold at its station as long ago as 1930.

Because of their apparent reluctance to keep up with other retailers, oil companies have gained a reputation for sluggishness among marketers.

Their performance has aroused some crusading non-petroleum merchandisers, who have prodded oil marketers for their slow acceptance of a seemingly inevitable trend (PW—Nov.11'60, p94). The service station cannot exist, they preach, by selling automotive products alone. It must diversify.

Those who would "modernize" the service station and its approach to selling reinforce their viewpoint with forceful arguments:

- The station is under severe competitive attack from chain stores and supermarkets that are ever expanding their line into automotive merchandising.
- The trend toward "one-stop" shopping subjects service station dealers to the competition of smart, fast-moving shopping-center operators.
- Dealers are faced with a decline in lube-bay services and a narrowing of their margins in gasoline. They need something besides tires, batteries, and accessories to fill the gap.

All these arguments have made a considerable impression on oil company marketers. They have scrambled to test practically everything that they might possibly sell at their service stations.

The list of products that have been tested (see box) testifies to the imaginative experimentation of oil merchandisers. And these products are not just items that major companies have recommended to their service-station dealers.

On the contrary, these items were purchased in volume by major companies for resale to their dealers.

Oil companies obviously have been trying to diversify their service stations—but something always frustrates the attempt.

Price is one of the most difficult obstacles oil companies face in trying to develop a new line of specialties for dealers.

The companies often are unable to redistribute products from other manufacturers to their stations for a price that is low enough to permit dealers to add a desired profit.

When they try, they find that their dealers have priced themselves out of the market.

There are other hurdles. The service station dealers cannot stock a sufficient variety of, say, car blankets to compete with a nearby department store.

Nor can they offer the repair services provided by neighborhood hardware stores, when they try merchandising such items as power lawn mowers.

Another problem is brand. One company tried selling its own brand of camera film through its chain of service stations. The film was made by E. I. du Pont de Nemours & Co. and was of excellent quality. But it did not have the brand name that camera fans are accustomed to looking for.

Dealer turnover (which is 26%) is another factor that limits diversification. Oil companies hesitate to introduce sidelines that require every dealer coming on the job to be specially trained in merchandising them.

This is doubly true for repair services. Complicated tuneups and wheel alignments are often too big a job for the unskilled mechanic who opens his first service station.

There are exceptions in all these areas. Many individual major-brand dealers have made sizable profits out

Flowers, Anyone?

There are some products that have been introduced at major brand service stations. But they failed to meet the test of acceptance—and were dropped: hobby horses, flowers and plants, cameras and camera film, power lawn mowers, outboard motors and marine accessories, TBA-filled Christmas stockings, car blankets, electric drill kits, razor blades, dog food, radios, automobiles, fertilizer, golf balls, dolls, compasses, lamps, Christmas tree lights, ship-to-shore radios, bug screens, and fishing tackle.

of fishing tackle, milk, trailer rentals, and heavy repairs.

But by and large, these are local successes that major companies have been unable to extend to other dealers.

Major companies that have tried—and failed—to expand their line of merchandise always come back to the basic TBA items. These products are more successful than any others.

The reason seems to be their interrelationship with the basic function of a service station—providing the simple services that make automobiles go.

This inter-relationship has so impressed itself on Humble Oil & Refining Co., for example, that the company has made it the fundamental principle in its criteria of new product selection.

According to Humble, new products (and services) should:

- Pertain to automobile care and operation.
- Call for relatively simple service from the dealer.
- Fit into the company's established sales and distribution system.
- Be profitable to the dealer and the company.

"Every time we have attempted to sell to dealers merchandise that failed to meet one of these criteria," says R. H. (Bob) Crum, Humble's TBA coordinator, "we have run into trouble. Trouble means disgruntled dealers, loss of money, and loss of business."

Although Humble will continue to test the applicability of specialties for service station merchandising, it appears to have more or less committed itself to products that are service- or energy-oriented.

Humble, today, calls itself the "energy company," and is slowly introducing a new brand name that reinforces this theme—Enco.

Underlying the paramount interrelationship between TBA items and the service station function are two controlling factors that limit diversification—money and time.

The great majority of dealers do not have the financial wherewithal to invest in an inventory of new specialty products—especially those where the risk of obsolescence is high.

And the marketing sales force can schedule very few hours to explaining how non-petroleum products should be merchandised.

This time factor also works in the favor of oil companies when they are faced with competition from food chains and drug stores, says Crum. A supermarket manager and a drug store proprietor are too wrapped up in the problems of selling food and cosmetics to try to understand the fine points of selling tires and batteries.

The time principle is also demonstrated by tire stores that sell gasoline as a sideline. As soon as they redistribute their merchandising effort in an attempt to increase their gasoline sales, their tire sales fall.

Up to now, service stations have been notoriously slow in pushing products that are related to gasoline sales, industry experts point out.

Over 60% of the battery market is held outside the service station. Over 72% of the new replacement tire market goes to service station competitors.

New car owners generally avoid service stations when they want antifreeze, spark plugs, or oil filters.

Crum attributes this to the group-thinking of motorists, which associate service stations with high prices, low stocks, no trade-in, little solicitation, and little know-how.

He recognizes that major companies share a responsibility for changing such attitudes, but filling the station with "a conglomeration of unrelated items" will probably not help, he believes.

Oil companies today have an added incentive for taking the sluggishness out of TBA merchandising. Tires, batteries, and accessories are beginning to represent a more important outlet for crude.

Tires, for example, represent an important step forward in the application of oil-derived products to TBA items.

This season, windshield deicing agents made their appearance. Under test or consideration are battery casing, wiper blades, floor mats, radiator hose, oil filters, and spark plugs.

These items once were just window-dressing in service stations and served as more or less a stimulant to gasoline sales.

But the petrochemical intermediates from which these TBA items are derived are more valuable profitwise—pound-for-pound—than the primary fuel.

What's New / IN MARKETING

Electric Heat Leads In Seattle Apartments

Electricity has a big lead in new apartment house heating in Seattle. But oil has a substantial majority of the new single-family dwellings, according to a local utility survey.

Electricity provides the heating for 834 new apartment houses in Seattle and King counties, compared with 90 for gas and 20 for oil.

New single-family homes (including duplexes and triplexes) reverse the order of fuel preference: of those surveyed, 1,529 use oil, 397 use gas, and 278 are heated by electricity.

The area studied includes districts north and south of the city but does not include a rapidly growing area east of Seattle where large housing developments are heated with gas.

•

API's Lubrication Committee marshalled several arguments last month in support of its stand on oil drain practices.

Speakers at the committee's winter meeting in Chicago agreed that today's short-trip driving demands severe service from motor oil.

A symposium of committee men presented evidence to indicate that oil should be changed at least every 2,000 mi. or every 60 days in summer or every 30 days in winter.

In an off-the-record session, the committee showed how it tried to make this clear to Ford Motor Co. last summer.

•

Pure Oil Co. will begin marketing Firebird Super gasoline next month with a trio of additives called Tritane.

The additives act against stalling, carburetor dirt, and engine wear. Firebird regular—also to be introduced—will contain both the antistalling additive and the carburetor detergent, but not the antiwear additive.

This shift in brand name will be effective throughout Pure's 24-state territory.

•

A "big step" in promoting the American brand name will be taken by Standard Oil Co. (Ind.) on May 23.

At that time, Standard will take full advantage of national advertising media to promote the brand, which wasn't possible until all its domestic marketing was reorganized under a single brand name.

E. F. Bullard L. W. Moore

E. F. BULLARD, chairman of Pan American Petroleum Corp., Tulsa, and **L. W. MOORE,** president of American Oil Co., Chicago, have been elected directors of Standard Oil Co. (Ind.), Chicago. Pan American Petroleum is Indiana Standard's exploration and production subsidiary, and Amoco is its marketing and manufacturing subsidiary. Bullard joined the Indiana Standard organization in 1921, and was president of Pan American Petroleum from 1945 to 1958. Moore, who joined Standard of Indiana in 1933, has been president of Amoco since 1957.

CHARLES H. WAGER, general traffic manager for Shell Oil Co., and Shell Chemical Co., in New York, has been appointed chairman of the American Petroleum Institute's central committee on railroad transportation. The committee includes traffic executives from oil companies throughout the country, and is concerned with the movement by rail of petroleum products.

J. B. DYSON, who is in charge of gas contracts for Christie, Mitchell & Mitchell, Houston independent, has assumed the additional duties of handling public relations for the company.

ORAN A. GRAYBEAL is the new administrative assistant to **R. E. Foss,** Sunray Mid-Continent Oil Co.'s senior vice-president for production, with offices in Tulsa. Graybeal succeeds **Gordon E. Hillhouse,** who has been named manager of engineering for production there, replacing **L. G. Rodgers,** who was recently named vice-president of Sunray Chemical Co., a subsidiary. Graybeal, who joined Sunray Mid-Continent in 1938, was most recently division production manager for the Western division, in Denver. **A. E. Meissner,** formerly district manager for the company at Corpus Christi, replaces Graybeal in Denver.

K. R. GERHART moves up to manager of manufacturing for Continental Oil Co.'s petrochemical department, in Houston. Gerhart joined Conoco in 1947 as a chemist at its Baltimore petrochemical plant, and became supervisor of the sales and service laboratory there in 1952. He was superintendent of the company's Chicago and Gretna (La.) petrochemical plants before moving to Houston in 1960 as assistant to the general manager of petrochemical manufacturing, his most recent position. At the same time, **J. D. Burns** has been promoted to technical assistant to Conoco's new manager of petrochemical manufacturing, at Houston. Burns was formerly assistant superintendent of the company's Gretna petrochemical plant.

K. R. Gerhart D. G. Levick

DOUGLAS G. G. LEVICK, formerly marketing coordinator for Standard-Vacuum Oil Co., has joined the marketing coordination department of Standard Oil Co. (N.J.), as marketing adviser for the Far East, and South and East Africa, with offices in New York. Stanvac's assets are currently being divided between its two owners, Jersey Standard and Socony Mobil Oil Co. Levick, who began his oil career with Jersey Standard in 1931, spent 11 years with marketing divisions of Esso Standard Oil Co., now a division of Humble Oil & Refining Co., Jersey's domestic affiliate. In 1946 he became sales division manager in Denver for Carter Oil Co., now a part of Humble. Two years later he joined Stanvac in the marketing coordination division, where he became assistant coordinator in 1958, and coordinator in 1960.

PAUL E. MOSTINI has been appointed executive assistant to the assistant general manager of producing and manufacturing for Mobil Oil Francaise, an affiliate of Mobil International Oil Co. Mostini, who has been in Mobil's Paris liaison office since 1959, served Mobil for 19 years in West Africa. He has been general manager for Mobil Oil Cameroun & Equatoriale Africa. **Jean Moulier** will replace Mostini in Paris. Moulier has been district sales manager in Equatoriale Africa.

P. C. LIVESAY has been appointed coordinator of manufacturing and purchasing for Standard Oil Co. (Ind.), with offices in Chicago. He was formerly refinery manager for the company at its plant at Sugar Creek, Mo.

C. E. GREENWOOD has been promoted to manager of Continental Oil Co.'s land section, with offices in Houston. He was formerly administrative assistant there to Conoco's president, **L. F. McCollum.** Greenwood, who joined Conoco in 1949 as a geologist, was promoted to district geologist at Corpus Christi in 1951. He transferred to Houston in 1954 as assistant to the regional geologist, and two years later became division geologist for the southern region's Gulf of Mexico division. He has been administrative assistant since 1960.

C. E. Greenwood W. J. Greenwald

W. J. GREENWALD is general manager of Humble Oil & Refining Co.'s new natural gas division, with offices in Houston. The division will be an operating group in Humble's headquarters organization, responsible for sales of natural gas. **John J. Carter** has been named manager of the natural gas division and will assist the general manager. Greenwald has been serving as acting assistant manager of producing investment coordination of the company's Humble division. His permanent assignment was chief reservoir engineer of the production department, Humble division. Carter, who joined Humble in 1934, has been manager of the Humble division's gas department since 1955.

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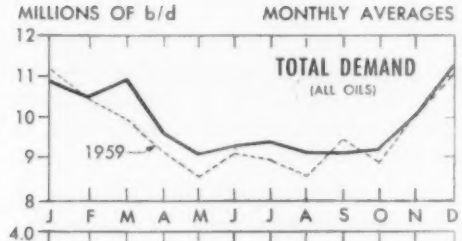
PETROLEUM WEEK'S

Fingertip Figures



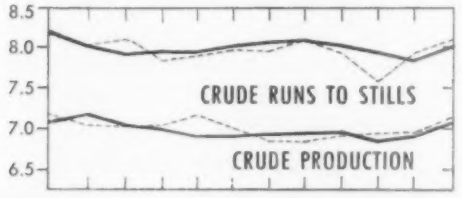
Figures for period ended Feb. 24, except as noted

TOTAL DEMAND

Latest 4-week average	11.218
Year ago	10.495

DISTILLATE DEMAND

Latest 4-week average	3.568
Year ago	2.967

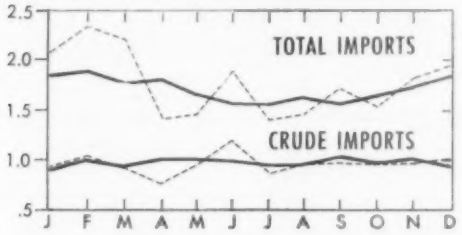


RUNS TO STILLS

Latest week	8.376
Previous week	8.447
Year ago	8.108

CRUDE PRODUCTION

Latest week	7.207
Previous week	7.167
Year ago	7.318

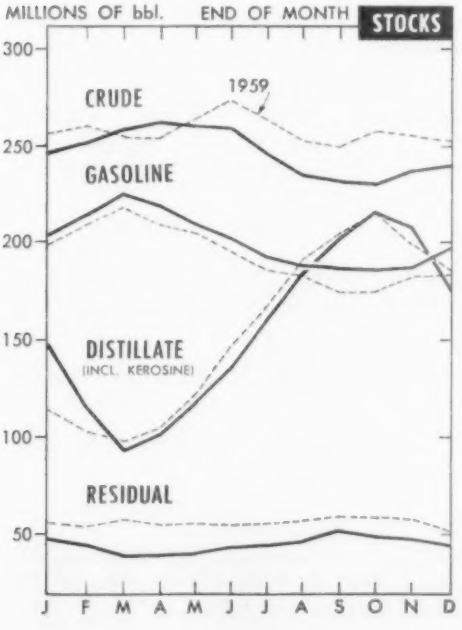


TOTAL IMPORTS

Latest week	2.222
Previous week	2.009
Year ago	1.897

CRUDE IMPORTS

Latest week	1.306
Previous week	1.018
Year ago	1.052



CRUDE STOCKS

Week-ended Feb. 17	230.6
Previous week	232.2
Year ago	251.6

GASOLINE

Latest week	221.1
Previous week	218.0
Year ago	215.6

DISTILLATES

Latest week	120.5
Previous week	121.3
Year ago	130.7

RESIDUAL

Latest week	43.1
Previous week	42.8
Year ago	45.3

Distillates demand is still holding strong compared with last year, but it has tapered off since early February.

Last week's demand for distillates averaged 2,818,000 b/d, 488,000 b/d below the peak reached the first week of February.

The pattern for total demand is cut on that for distillates, since gasoline demand is still not strong enough to offset the lower call for light fuel oils.

Demand for all oils averaged 11,218,000 b/d during the past four weeks, a hefty 723,000 b/d higher than a year ago. But it, too, has been tapering downward in recent weeks.

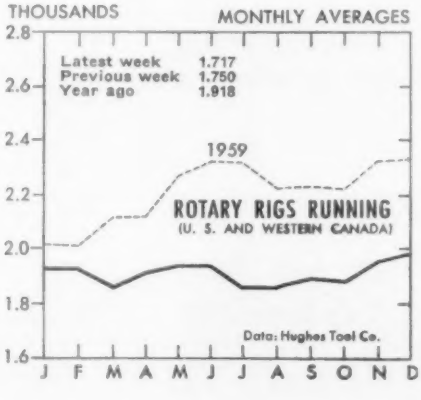
A premature case of spring fever seems to have hit stocks. Movements were sluggish last week.

Stocks of heating oil and kerosine last week took the smallest dip since the end of November. Inventories fell a meager 752,000 bbl. to 121.3-million bbl.

Gasoline stocks increased more than 3-million bbl. last week to 221.1-million bbl., or 5.5-million bbl. higher than last year's level. Obviously, the milder weather hasn't tempted motorists to leave their warm firesides for the highway.

One encouraging note in the latest week's statistics was a slight decline in refinery runs.

The average was 8,376,000 b/d, down 71,000 b/d from the all-time high set the previous week.



The Market Trend

No. 2 Fuel: Blamed for Making a Comeback

If you have to pick a whipping boy, why No. 2 fuel? Last week, Interior Secretary Udall expressed "concern" over the season's price advances for light heating oils. New York City prices, for example, have risen 13% since the cold weather hit.

This season, East Coast prices for No. 2 fuel have risen 1.8¢ a gal. on the average. A September advance of 0.3¢ a gal. was washed out in November. Then three increases followed: 0.8¢ a gal. in December; 0.5¢ in January; and another 0.5¢ in February.

Home heating oils have not shown the persistent price advances of many other commodities. Peak retail prices for New York City, in winter, for the past five years are as follows: 15.9¢; 14.9¢; 15.6¢; 15.1¢; and 16.0¢.

In fact, it's difficult to trace even seasonal price moves over the past several years. In 1957, East Coast No. 2 fuel prices fell in May, June, July, August, and October. But in 1958, prices fell in February, four times in March, and then turned upward in the height of summer, in July.

Much of this season's advances in light fuel oils was in the nature of recovery increases. Gulf Coast cargo prices for No. 2 fuel have risen from a weak 7.5¢ last summer to a strong 9.5¢ today. At the low of the cycle, refiners were selling for less than the cost of making the fuel.

And this bulge in prices since December took place when pressures were very strong for much larger increases. Spot tanker rates from the Gulf to New York have risen from $2.57 a ton (about 0.8¢ a gal.) to the present $4.56 (nearly 1.5¢). At the low of the cycle, again, tanker owners were operating U.S.-flag vessels below cost.

Actually, the Administration might draw some consolation from the fact that No. 2 fuel prices haven't run away on the upside. There was a time not too far back (PW—Feb.10'61,p46) when nothing was offered prompt in the Gulf. Just then, too, European buyers were pulling heavily on Caribbean supplies. Had the Europeans been driven to the U.S. Gulf, prices could have taken off like a bird.

Dealer Margins Up:

Another aspect of the No. 2 situation is that small dealers stand to benefit more than large refiners. At Boston and Albany, dealer margins have expanded by 0.5¢ a gal. At New York the increase is 0.6¢, and it's 0.4¢ at Philadelphia.

Troubles in the Los Angeles Basin:

Los Angeles suffered a price relapse last week when gasoline was posted 1¢ to 3¢ lower at most stations. Some major brands have been cut from 30.9¢ to 27.9¢, including taxes.

The Los Angeles market is the biggest in the world—nearly 200-million gal. a month.

And the trouble is that some of the independents now really are majors, but want to continue pricing "2¢ off" (PW—Feb.24'61,p42).

Ship Rates Off:

Ship rates for U.S. tankers usually start to slide in February, and this year is no exception. The last paid clean Gulf New York rate is now "plus 60%," down 14¢ a ton. More declines will follow.

The Market Place

AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of February 27

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12.25-13.25
- Gasoline, 92 oct reg....11.25-11.5
- Kerosine....10.25-10.75
- Heating oil, No. 2....9.5-10
- Gas oil, 48-52, d.i....9.75
- Fuel oil, bunker "C"....$2.30-2.40

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....10.875
- Gasoline, 87 oct research reg....9.5
- Gasoline, 80 oct research....8.75
- Gasoline, 70-72 oct motor method....8.625
- Kerosine....9.875
- Heating oil, No. 2....8.625
- Gas oil, 48-52 d.i....8.875
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....11.65-11.9
- Heating oil, No. 2....10.65-10.9
- Fuel oil, No. 6....$2.62

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....12.5-13.25
- **Kerosine....10.75↓-11↓**
- Heating oil, No. 2....9.25-9.75
- Fuel oil, No. 6....$1.80-1.90

Chicago, bulk
- Gasoline, 92 oct reg....12.375-12.625
- Heating oil, No. 2....10.25-11.85
- Fuel oil, No. 6 high sulfur....7.65

Los Angeles, rack
- Gasoline, 88 oct reg....11.1-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.90
- Heavy fuel, PS 400....$2.10-2.45

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....4.5-5
- Propane, Baton Rouge....5.875

Pennsylvania Lubes
- Bright stock, 25 p.t....26
- 200 vis. neutral, 25 p.t....28

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....26-27
- Neutral solvent, 200-210 vis....23-24

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....26-27
- Neutral, solvent, 200 vis....23-24

Eastern Hemisphere

Singapore (Pulau Bukom) cargoes
- Avgas, grade 100/130....15.5
- Gasoline, 79 oct research....9
- Kerosine....9.75
- Gas oil, 48 d.i. minimum....9

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.69-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....2.96-3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....4.80
- California, Signal Hill, 21.0-21.9....2.33†
- North Louisiana-Arkansas, 36.0-36.9....2.72-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.425
- Virden (Man.)....2.285

Venezuela (Cargoes, FOB lifting port designated)
- San Joaquin, 41.0-41.9, Puerto la Cruz....$3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat, La Salina....1.85
- Lagomar, 31-31.9, Cardon....2.55
- Lagunillas Heavy, flat, La Salina....2.07

†Differential per deg. of grav. varies

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$1.80
- Safaniya, 27.0-27.9, Ras Tanura....1.47
- Iran, 34.0-34.9, Bandar Mashur....1.78
- Iran, 34.0-34.9, Abadan....1.73
- Iraq, 35.0-35.9, Fao....1.72
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.59
- Qatar, 41.0-41.9, Umm Said....1.95
- N. Zone, Burghan, 23.5-24.4, Mina Saud....1.48
- N. Zone, Ratawi, 23.5-24.4, Mina Saud....1.41
- N. Zone, Eocene, 16.5-17.4, Mina Saud....1.28

Middle East, Eastern Mediterranean
- Arabia, 34.0-34.9, Sidon....$2.17
- Iraq, 36.0-36.9, Tripoli, Banias....2.21

North Africa, Phillipeville, Algeria
- Hassi Messaoud, 48 and above....Withdrawn

KEY TANKER RATES

(Last paid, per long ton, single voyage)

U.S. Gulf-New York, clean..(ATRS+60%) $4.56↓
U.S. Gulf-New York, dirty....(ATRS+42½%) $4.06
NWI-USNH, dirty....(ATRS—60%) $1.10
NWI-UK/Cont., dirty....(Scale—65%) 11/5*↓
Pers. Gulf-UK/Cont., dirty (Scale—51¾%) 30/1*↑
Pers. Gulf-USNH, dirty....(USMC—65%) $4.45↓

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R. R. Rhodes

T. Davenport

ROBERT R. RHODES is the new sales manager for Worthington Corp.'s standard pump division, at East Orange, N. J., and **THEODORE DAVENPORT** moves up to the newly created position of manager of planning for the division. In his new position, Rhodes succeeds **Lewis M. Evans,** who has become eastern regional resale sales manager, marketing division. Rhodes joined Worthington's Harrison (N.J.) research engineering department in 1943, and transferred to the standard pump division in 1955. He was most recently assistant sales manager for that division. In his newly created position, Davenport will be responsible for the development and acquisition of new products for the division. He has been with Worthington since 1938 when he became a member of the Harrison division service and erection department. He was named application engineer for the centrifugal pump section in 1946, and became Worthington's chemical consultant in 1955, a position he has held to the present time.

CHARLES O. ZAGST is president of Zagst, Inc., Houston, a new engine dealer in Texas for Caterpillar Tractor Co. The company will provide sales, parts, and service for the full line of Caterpillar diesel and natural gas engines. Zagst, who has had 20 years' experience in diesel and natural gas engine applications, has been an oilfield drilling contractor and has served on the engineering staff of an oil company. Before forming his own company, in Houston, Zagst was vice-president sales, for another engine dealer.

C. O. Zagst

R. E. Gorman

RAY E. GORMAN has been named Mid-Continent area sales manager for the Baash-Ross Division of Joy Mfg. Co., with offices in Oklahoma City. He was formerly sales manager of the Dallas-Ft. Worth district for Baash-Ross.

PAUL A. QUANTZ has been appointed manager of product planning and methods for the industrial computer systems department of Radio Corp. of America, with offices at Natick, Mass. The department is one of the principal units in the RCA electronic data processing division. In his new position, Quantz will be responsible for product planning, market forecasting, competitive analysis, applications analysis, and programming. Before joining RCA in 1960, Quantz was associated with International Business Machines Corp. and Burroughs Corp.

DAVID KNAPP has been named vice-president and director in charge of European marketing activities for industrial chemicals sold by California Chemical Co.'s Oronite Division. He will have headquarters at California Chemical's international offices in Geneva, Switzerland. Knapp has been with California Chemical's parent, Standard Oil Co. of California, for the past ten years. He most recently served on the Eastern Hemisphere staff providing staff assistance to the officers of California Standard on affairs of California Texas Oil Co., an affiliate.

D. Knapp

C. F. Bateman

COATES F. BATEMAN has been elected executive vice-president and a director of Symington Wayne Corp., Philadelphia. Bateman was formerly vice-president and general manager of the Wayne division. In his new position, he will be in charge of the company's railroad and industrial operations as well as those in the petroleum equipment field, for which he already has responsibility.

HUGH G. DEAN has been named sales manager for Springfield Boiler Co., Milwaukee, subsidiary of Cleaver-Brooks Co. He was formerly Detroit district sales manager for Foster-Wheeler Corp.

LARRY DRAKE is chairman, and **O. B. Avent** is president, of Go Jet Services, Inc., a new wireline service company with executive offices in Tulsa, and **B. D. Nation** is secretary-treasurer for the new company. The three officers were formerly associated with the Welex Division of Halliburton Co. Drake, who will be in charge of sales for Go Jet Services, was formerly vice-president and Oklahoma division manager for Welex. Avent was formerly vice-president in charge of Welex Jet Services. He will main-

tain administrative and operations headquarters for the new company in Pauls Valley, Okla. Nation has been district manager for Welex in Pauls Valley. He will manage the first district offices for Go Jet Services there. Go Jet Services is associated with Go Perforator Supply, Inc., Ft. Worth.

ROBERT B. HILL has been appointed wellhead sales supervisor for the southern region of the National Supply Division, Armco Steel Corp., with offices in Houston, and **ROBERT H. CALDWELL** has been appointed wellhead sales supervisor for the northern division, with offices in Denver. Hill, who joined National Supply in 1941, became field engineer, wellhead sales, for the Houston plant in 1955, and sales supervisor at Dallas in 1958. Caldwell joined the company in 1952 as sales engineer on gas lift equipment, and was most recently sucker rod sales engineer at Tulsa.

E. C. CHAPMAN is the new assistant manager of Caterpillar Tractor Co.'s sales development department, in Peoria, Ill. At the same time, **J. A. Justeson** was named manager of the new western division, which resulted from the merger of the northwest and southwest sales divisions. **W. E. McCoy,** manager of the southwest division, succeeds Chapman as manager of the eastern division. Chapman joined Caterpillar in 1945, and became assistant manager of eastern sales in 1952. He has been eastern sales manager since 1956.

RUDD G. SEIM moves up to manager of Continental-Emsco Co.'s California division, with headquarters in Los Angeles, and **H. T. Haugh** succeeds him as district manager of its tri-state area, at Evansville, Ill. The tri-state area covers Illinois, Indiana, and Kentucky. Haugh was formerly in charge of sales for C-E's Chicago office.

R. G. Seim

G. Carroll

GALE CARROLL is the new executive vice-president of Tube Process Corp., Houston. He is the developer of the centrifugally cast lining process used by Tube Process. Carroll was formerly sales manager for Tube-Kote, Inc., and has been connected with the engineering and sales of internally coated oilfield and industrial pipe since 1945.

JAY G. McKIE has been appointed to manager of marketing techniques in central staff marketing for Texas Instruments Inc., Dallas. In his new position, McKie will assist all TI product division marketing departments and marketing personnel in developing new marketing methods and techniques. McKie has been Dallas area representative for Metals & Controls, Inc., a TI subsidiary, since 1960, and before that was sales engineer for the subsidiary. **C. H. McCarthy,** a product specialist for M&C at Attleboro, Mass., succeeds McKie as the firm's Dallas area representative.

A. A. Prats, Jr.

G. Howell

A. A. PRATS, JR., has been promoted to sales manager, Gulf Coast division, for Tube-Kote, Inc., with responsibility for the Houston, Lafayette, and New Orleans areas, and **GRADY HOWELL** moves up to sales manager, northern division, responsible for North Louisiana, North Texas, Oklahoma, and Arkansas. At the same time, **Joe Williams** was named sales manager for the Canadian division, and is responsible for all Tube-Kote Canadian sales. The company is engaged in the coating of oil country tubular goods with thermosetting plastics to prevent corrosion and paraffin deposition.

DR. RICHARD B. CUDDEBACK has been promoted to supervisor of market development for molecular sieves manufactured by Linde Co., division of Union Carbide Corp. His offices will be in Tonawanda, N. Y., where Linde molecular sieves are produced. Cuddeback was formerly technical representative for the product line in New York City. At the same time, **Joseph P. Fris** and **Edward L. Clark** have been named regional sales managers. Fris will be in charge of the northeast area, with offices in Moorestown, N. J., and Clark will be in charge of the southwest area, with offices in Houston. **J. P. Maltbie** is a new sales engineer in the central states area, with offices in Chicago, and **R. W. Alexis** is a new sales engineer in the New Jersey, New York, and New England area, with offices in Moorestown.

J. M. STERLING has been appointed to factory manager of Minneapolis-Honeywell Regulator Co.'s electronic data processing division, responsible for production operations at Brighton and Lowell, Mass. Sterling has been with Honeywell since 1950, when he joined its Brown Instruments division. He was most recently personnel director for its electronic data processing division.

BRUCE BUNTEN has joined Badger Mfg. Co., Cambridge, Mass., as personnel manager. He was formerly personnel manager for the Boston division of Minneapolis-Honeywell Regulator Co.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT • BUSINESS EQUIPMENT — USED OR RESALE

OPPORTUNITIES

DISPLAYED RATE

EQUIPMENT & BUSINESS OPPORTUNITY advertising $16.75 per inch.

EMPLOYMENT OPPORTUNITIES—$28.00 per inch, subject to Agency Commission.

UNDISPLAYED RATE

(Not available for equipment advertising)

$1.80 a line, minimum 3 lines.

POSITIONS WANTED undisplayed rate is one-half of above rate, payable in advance.

Box Numbers—Count as one line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

MANAGER— NATURAL GAS SALES

Medium-size fully integrated oil company needs an experienced professional engineer with ten or more years in the natural gas industry. This man must have the ability to initiate gas purchase contracts and negotiate for the sale of natural gas after determining the feasibility of such sales through economic studies. Familiarity with the southwestern and Rocky Mountain areas of the United States is a necessity.

All replies are strictly confidential and our employees know of this advertisement. Submit a complete résumé, including recent photograph, salary requirements, and references to P-6128, Petroleum Week, 520 N. Michigan Ave., Chicago 11, Ill.

PRODUCING LEASE
IVANHOE DOME FIELD
CENTRAL MONTANA TYLER PRODUCTION

SEALED BIDS will be received by the undersigned until 2:00 o'clock P.M., Friday, March 31, 1961, for purchase by cash of 100% of the working interest of five (5) Tyler sands wells (presently producing approximately 220 BOPD) and miscellaneous personal property constituting and located upon the following:

All of Sec. 16, T-11N, R-31E, Musselshell and Rosebud Counties, Montana, containing 640 acres, more or less.

Additional information may be requested from or inspected at 803 Midland Bank Building, Billings, Montana.

The right to reject any or all bids is reserved.

Final decision with reference to the disposition of the bids will be made within fifteen (15) days of the opening.

Upon acceptance of any bid the applicant must tender a certified check in the amount of $10,000.00 within five (5) days of notification of acceptance. Balance upon title clearance.

J. V. Montalban,
Receiver for R. P. Oliver Ltd.
803 Midland Bank Building
Billings, Montana

BUSINESS OPPORTUNITIES

Use this Classified Advertising Section for bringing business needs or opportunities to the attention of men associated in administrative, executive, management, sales and responsible technical engineering and operating capacities within the oil industry

PETROLEUM WEEK

Every Coin Has Two Sides, You Know

EVERYONE HAS THE RIGHT to carp, comment, and criticize, but weren't most of the recent comments about No. 2 fuel oil prices about as unreasonable and unrealistic as they come?

The way some people were putting it, you'd think the oil industry was engaged in a gouging operation. Terms like "excessive," "unconscionable," "unwarranted," and "inflationary" were bandied about without any regard for facts.

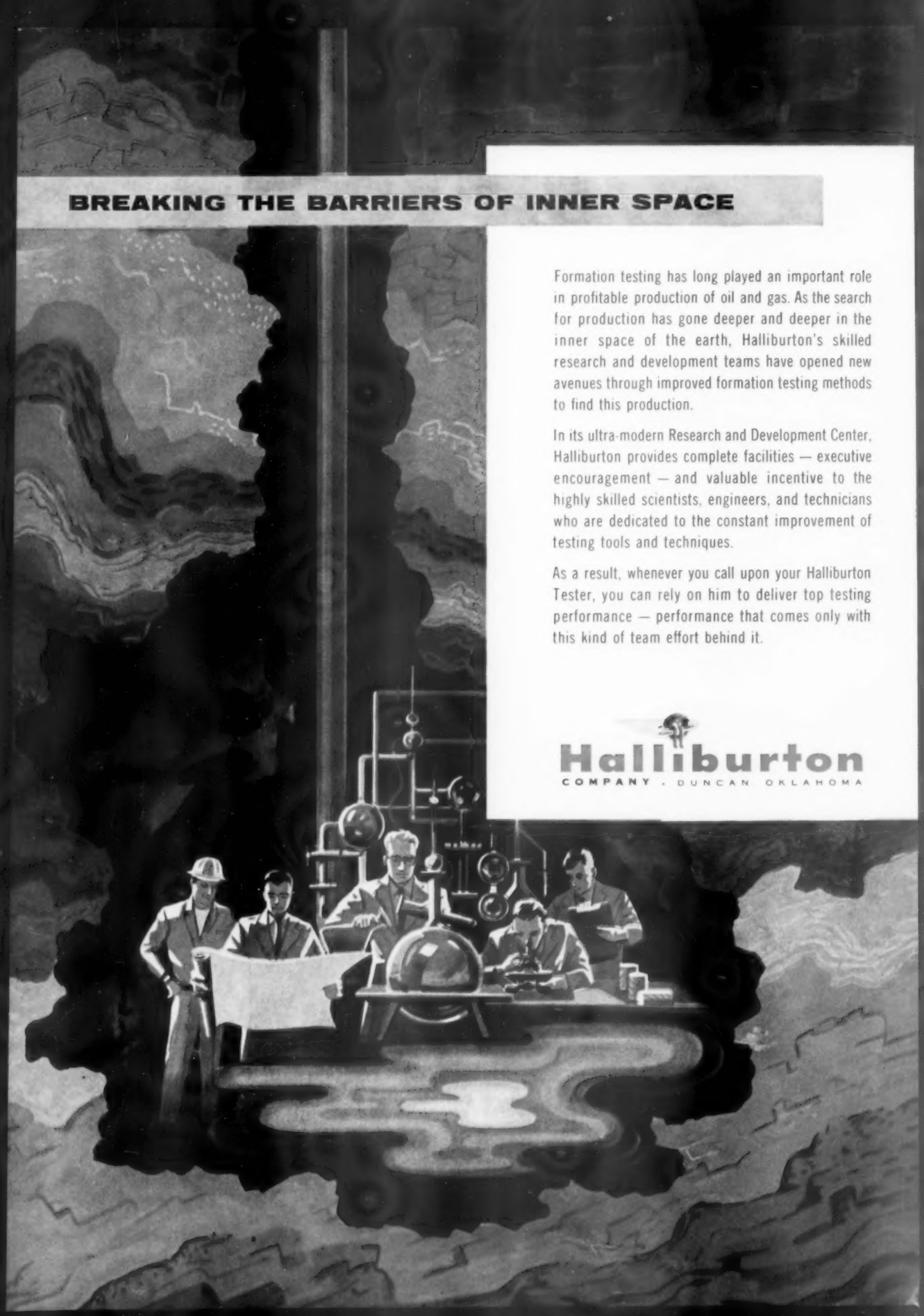
It's a funny race of people that we Americans are. When prices go down, there's no doubt in anyone's mind that this is competition, good old-fashioned competition, at work. But when they go up, even though they're due to seasonal fluctuations or recoveries from depressed levels, boy that's something else again. And words like highbinding, profiteering, and so on are rolled out with reckless abandon.

BUT WHAT ABOUT No. 2 HEATING OIL? Were the price increases out of line? Let's look at the facts. True, there have been several increases this winter for spot cargoes on the Gulf—one of the primary wholesale markets. And all can be attributed to the cold weather over most of the nation that brought higher demand, brought a squeeze on transportation and delivery facilities, and made the situation tight. But at that, the February price was only 9.5¢ per gal. at the Gulf. This was 1½¢ over February, 1960 (and that was a depressed period, remember?), and it's still under 1959's February price of 9.875¢. Obviously then, these prices aren't unreasonable.

ON THE HOME-DELIVERY FRONT, bitter cold, exceptional snowfalls over most of the nation, and abnormal demand took their toll in higher operational costs.

As we said, everyone has the right to criticize. But let's use common sense. Inflammatory statements such as the one that accompanied a proposal that went before the Maryland legislature, for example, aren't fair or necessary. This proposal called for a legislative investigation of "unconscionable" price increases. And a finger could be pointed, too, at Secretary of Interior Stewart L. Udall for his unfortunate choice of words in relaying President Kennedy's concern about fuel oil prices. Udall said the Administration "isn't going to stand by and see excessive and inflationary things of this nature" take place. The facts do not support this contention at all.

We don't want to carp either, but every coin has two sides. Isn't it more sensible to look at both first, then comment?



BREAKING THE BARRIERS OF INNER SPACE

Formation testing has long played an important role in profitable production of oil and gas. As the search for production has gone deeper and deeper in the inner space of the earth, Halliburton's skilled research and development teams have opened new avenues through improved formation testing methods to find this production.

In its ultra-modern Research and Development Center, Halliburton provides complete facilities — executive encouragement — and valuable incentive to the highly skilled scientists, engineers, and technicians who are dedicated to the constant improvement of testing tools and techniques.

As a result, whenever you call upon your Halliburton Tester, you can rely on him to deliver top testing performance — performance that comes only with this kind of team effort behind it.

Halliburton
COMPANY · DUNCAN, OKLAHOMA

Abrasijet...
a profitable way to complete a well

This cross-section illustration, as visualized by an engineer, shows a formation being notched with Abrasijet* — the Dowell-developed abrasive jetting service. The drawing was based on tests in which formation samples were notched with Abrasijet.

Notice the large surface area exposed by the notch. Notching with Abrasijet is an important starting point for recently-introduced frac design techniques. Abrasijet is also used for difficult perforating, vertical slotting of casing and cleaning open holes.

Results from hundreds of wells notched with Abrasijet and fractured by Dowell have been excellent, compared with similar wells fractured after perforating with explosives. Injection pressures required for fracturing have been lowered. Production increases have been outstanding. Gas/oil or water/oil ratios were improved. Occasionally, results from Abrasijet alone have been so good that fracturing was not required.

Ask your Dowell representative about Abrasijet. Dowell services and products are offered from more than 150 offices and stations in the United States, Canada, Venezuela, Argentina, Germany, France and the Sahara area. Dowell, Tulsa 1, Oklahoma.

*DOWELL SERVICE MARK

SERVICES FOR THE OIL INDUSTRY

DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY